

Installing the DG/UX® System

069-701140-04

For the latest enhancements, cautions, documentation changes, and other information on this product, please see the Release Notice (085-series) and/or Update Notice (078-series) supplied with the software.

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Preface

This manual explains how to install and upgrade DG/UX[®] operating system software, including the generic and information security DG/UX products, on Data General AViiON[®] systems.

For a list of current releases, see the notice that you received with your system.

Although this manual does not require expert knowledge of UNIX[®], some system administration training or knowledge will help if you are making changes to the default DG/UX system configuration. If you need to review commonly used UNIX commands or the file system layout of the UNIX operating system, you can refer to *Using the DG/UX[®] System* for general information on these topics.

The DG/UX manuals for the DG/UX operating system are on the documentation CD-ROM. You can view the contents of the documentation CD-ROM on a PC running Microsoft Windows or Windows NT. For how to set up the software and view the DG/UX manuals, refer to the documentation provided with the CD-ROM.

IMPORTANT The documentation for information security software is not included on the DG/UX documentation CD-ROM. Information security software ships with the necessary printed manuals.

How this manual is organized

This manual is the first in a set of documents that address DG/UX system administration tasks. After completing the tasks in this manual, you then go to one of the manuals listed in the “Related Documents” section, later in this Preface.

This manual contains the following chapters and appendixes:

- Chapter 1 Provides information you need before installing or upgrading your system. Helps you collect the information you supply during the installation or upgrade procedure and introduces concepts to help you plan disk resources.

- Chapter 2 For users whose computer system was preloaded with the latest version of the DG/UX system software at the factory. Gives instructions for powering up your computer system, setting up software packages, and building and booting a kernel.
- Chapter 3 For installing the DG/UX system on a clean or newly formatted system disk. Explains powering up the computer system, booting the release media to start the DG/UX installer program, completing package setup, and building and booting a kernel.
- Chapter 4 For upgrading a system running a previous release of DG/UX. See your notice for a listing of current releases.
- Chapter 5 Explains steps required to install or upgrade DG/UX software on a computer system whose hardware configuration does not include a local (physically attached) CD-ROM drive.
- Chapter 6 Explains how to set up an alternate release area, how to perform a stand-aside upgrade of the DG/UX system into the alternate release area while the system is running and providing user services, and how to boot the DG/UX system from the alternate release area after the software is installed and set up there.
- Chapter 7 Explains tasks necessary to complete installation, such as logging in, assigning passwords to the **root** and **sysadm** accounts, and documenting your configuration. Tells where to go for information about additional configuration tasks and setting up the documentation CD-ROM.
- Appendix A Supplies blank planning worksheets to record the information you provide during the installation procedure.
- Appendix B Contains a sample dialog for a DG/UX installation on an Intel-based system using a local CD-ROM device.
- Appendix C Presents additional information on the DG/UX **boot** command, much of which is taken from the online man page and printed here for quick reference.
- Appendix D Explains how to respond to installation or upgrade problems.

Related documents

The manuals listed in this section contain detailed information on topics that are introduced in this manual. For instructions on how to view the manuals, refer to the documentation provided with the DG/UX documentation CD-ROM.

If you need additional manuals, please contact your local Data General sales representative.

DG/UX system administrator manuals

Analyzing DG/UX® System Performance (069-701142).

Tells how to analyze DG/UX system performance and fine-tune a system. Explains how the DG/UX system uses the CPU, virtual memory, file systems, and I/O devices.

Configuring and Managing a CLARiiON® Disk-Array Storage System — DG/UX® Environment (014-002323).

For system operators, this manual explains how to configure and manage a Series 2000 or Series 1000 disk-array storage system with AViiON computers and the DG/UX operating system. It describes how to plan, configure, and manage the storage system, and complements the storage-system installing and maintaining manual and the DG/UX operating system manuals.

Installing and Managing Printers on the DG/UX® System (069-701143).

Describes how to install, configure, and manage printers on the DG/UX system. It provides instructions for connecting cables, selecting the proper **stty** options and emulation modes, and troubleshooting printer problems.

Managing Mass Storage Devices and DG/UX® File Systems (069-701144).

Explains how to manage disk and tape drives. Also explains DG/UX file systems, virtual disks, mirrors, and caching.

Managing the DG/UX[®] System (069–701141).

Discusses the concepts of DG/UX system management. Explains how to customize and manage a system using commands and the **sysadm** system management tool. Includes instructions for booting and shutting down the system, backing up and restoring files and file systems, and recovering from system failure. Tells how to manage users, system services and activity, application software, and accounting.

Preventing and Fixing Problems on the DG/UX[®] System (069–701145).

Presents tips and techniques for preventing and/or fixing typical problems you may have with your DG/UX system.

DG/UX security manuals

The DG/UX manuals for information security products are not included on the DG/UX documentation CD-ROM. They are shipped in printed form with the security products.

Managing Security on the DG/UX[®] System (093–701138).

Describes for the system administrator how to manage security features.

Managing Security Auditing on the DG/UX[®] System (093–701139).

Describes for the system administrator how to manage audit features.

Programming for Security Features on the DG/UX[®] System (093–701140).

Describes the programming features of the security products.

Using Security Features on the DG/UX[®] System (093–701137).

Describes for the user how to use the security features.

Network administrator manuals

Managing ONC[™] /NFS[®] and Its Facilities on the DG/UX[®] System (069–701136).

Explains how to manage and use the DG/UX ONC[™] /NFS[®] product. Contains information on the Network File System (NFS), the Network Information Service (NIS), Remote Procedure Calls (RPC), and External Data Representation (XDR).

Managing TCP/IP on the DG/UX® System (069–701137).

Explains how to prepare for the installation of Data General's TCP/IP (DG/UX) package on AViiON computer systems. Tells how to tailor the software for your site, use **sysadm** to manage the package and troubleshoot system problems.

Format conventions

We use the following format conventions in this manual:

Convention	Meaning
boldface	Indicates text (including punctuation) that you type verbatim. All DG/UX commands, pathnames, and names of files, directories, and manual pages appear in this typeface.
<code>monospace</code>	Represents a system response (such as a message or prompt), a file or program listing, or a menu path.
<i>italic</i>	Represents variables for which you supply values; for example, the name of a directory or file, your username or password, and explicit arguments to commands.
\$ and %	Represent the system command prompts for the Bourne and C shells, respectively. Note that your system might use different symbols for the prompts.
{ }	Braces indicate a choice of arguments. You must enter one of the enclosed arguments. Do not type the braces; they only set off the choices.
[]	These brackets surround an optional argument. Don't type the brackets; they only set off what is optional.
[]	Boldface brackets are literal characters that you must type.
...	Means you can repeat the preceding argument as many times as appropriate.
↵	Represents the Enter key. (On some keyboards this key is called Return or New Line.)

< >	Angle brackets distinguish a command sequence or a keystroke (such as <Ctrl-D>, <Esc>, and <3dw>) from surrounding text. Don't type the angle brackets.
< , > , >>	These boldface symbols are redirection operators, used for redirecting input and output. Boldface angle brackets are literal characters that you must type.

Contacting Data General

Data General wants to assist you in any way it can to help you use its products. Please feel free to contact the company as outlined below.

Manuals

If you require additional manuals, please contact your local Data General sales representative.

Telephone assistance

If you are unable to solve a problem using any manual you received with your system, telephone support is available with your hardware warranty and with Support Plus and Hotline Software Support service contracts. If you are within the United States or Canada, contact the Data General Customer Support Center (CSC) by calling 1-800-DG-HELPS. Lines are open from 8:00 a.m. to 5:00 p.m., your time, Monday through Friday. The center will put you in touch with a member of Data General's telephone assistance staff who can answer your questions.

For telephone assistance outside the United States or Canada, ask your Data General sales representative for the appropriate telephone number.

Data General on the World Wide Web

Data General's comprehensive information library provides Internet users with access to virtually all of Data General's publicly available information and to a variety of feature articles and white papers on critical issues in computing. Browse through product and service

catalogs, our Solutions Directory, partner and customer profiles, and other publications.

Internet users can reach Data General's web server at **<http://www.dg.com>**. In addition, you can send us e-mail at **aviion@dg.com**.

Data General's Customer Support Center (CSC) provides Internet users with access to a Service Request Menu, Electronic Search Program, a Bulletin Board, Monthly Newsletters, Weekly Bulletins, Maintenance Updates, patches, and important information on a variety of operating systems. An active support contract may be required for certain features.

Internet users can reach the CSC web server at **<http://www.csc.dg.com>**.

Data General Users Group

NADGUG, the Independent Data General Users Group, is a unique network of Data General users who wish to discover more about working computer environments and how to use them. As a professional, user-run organization, NADGUG members make contacts with colleagues, share expertise and perspectives, and influence the companies that provide products and services. The User Group is your connection to expert users of Data General products, including AViiON open systems, CLARiiON advanced storage solutions, PCs, and ECLIPSE MV systems. Getting just one solution from a fellow member can more than pay for the cost of belonging to NADGUG. To join or for more information, call 1-800-253-3902 or 512-335-2286.

End of Preface

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1

Before you start

Use this chapter to collect information you need to install or upgrade DG/UX[®] operating system software, including the generic and security information products, on Data General AViiON[®] systems. You will need this information during the installation and upgrade processes defined in other chapters of this manual. We recommend that you write down the information you gather on copies of the installation **planning worksheets** provided in Appendix A.

Sections of this chapter help you do the following:

- Understand the meaning of a preloaded installation, a full installation, a clean installation, and an upgrade.
- Ensure that your system meets prerequisites.
- Determine which DG/UX software packages to load from the release medium.
- Verify that you have the disk space you need for the packages you are installing.
- Identify the names of your boot, load, and system disk devices.
- Plan, if applicable, the layout of virtual disks on your system disk.
- Collect, if applicable, information required when installing or upgrading the Data Backup Utility[™], ONC[™], and TCP/IP packages.

This chapter also provides an overview of the installation process, and some conceptual information to help you plan for the best system performance.

DG/UX documentation CD-ROM

With your order, Data General Corporation ships a documentation CD-ROM that contains DG/UX manuals and software for viewing those manuals on-line. For instructions on setting up the software and viewing the on-line manuals, see the documentation provided with the CD-ROM.

Your order also includes printed copies of *Installing the DG/UX System* (this manual) and *Preventing and Fixing Problems on the DG/UX[®] System*. Manuals for DG/UX system security products are shipped as printed books only and are not on the DG/UX documentation CD-ROM.

Summary of installation or upgrade

You complete your installation or upgrade in the following four phases:

1. Preparing the system (root) disk.
2. Loading (copying) software packages from the DG/UX release medium onto the system disk.
3. Setting up (configuring) the software packages.
4. Building, and then booting, the configured kernel.

The stand-alone **sysadm** installer utility completes most tasks automatically. Within each phase, which steps you complete depends on your configuration.

There are four ways to install the DG/UX system:

- A *preloaded installation*—your computer system came from the factory with DG/UX system software loaded on the system disk. The first two phases of installation are already complete when you get your computer system. You still need to set up the packages and configure, build, and boot the kernel as explained in Chapter 2.
- A *full installation*—you load the contents of the release medium on a newly formatted or blank system disk as described in Chapter 3.
- A *clean installation*—you have an existing system, but need to load the contents of the release medium on a clean system disk. You first clean the system disk and then do a full installation. For example, you do a clean installation if you need to reload and restore from backups, or if you have an existing DG/UX system and want to replace it with a version of the DG/UX system with information security software.

Chapter 3 describes how to clean an existing system disk before doing a full installation of DG/UX.

- An *upgrade installation*—you load the contents of the release medium onto an existing DG/UX system (with or without installed maintenance updates). Chapter 4 presents instructions for performing an upgrade installation.

Table 1-1 summarizes the installation steps for each type of installation. The figure following the table lists which chapters of this manual to read for the type of installation you are performing.

Table 1–1 Installing the DG/UX system: step summary

Installation Tasks	Type of Installation		
	Preload	Full	Upgrade
1: Insert medium Insert release medium in drive. Insert boot floppy (if applicable; no SCM).		✓ ✓	✓
2: Prepare system disk Turn on your computer. Boot stand-alone sysadm from release medium. Start the installer program. Prepare physical disk(s). Register physical disk(s). Create required virtual disks. Mount swap , root , and usr virtual disks.	✓	✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓
3: Load software Specify load device. Select packages to load. Choose automatic or interactive build/boot. Create virtual disks for optional packages. Mount virtual disks for optional packages. Verify available disk space. Choose advance package setup or interactive load. Copy (load) packages from release media.		✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓ ✓ ✓
3: Set up software packages	✓	✓	✓
4: Build and boot a new DG/UX kernel	✓	✓	✓
5: Log in and set passwords	✓	✓	
6: Perform additional or custom installation tasks	✓	✓	
7: Perform post-upgrade tasks	✓	✓	✓

The flowchart in Figure 1–1 summarizes the steps to complete your installation.

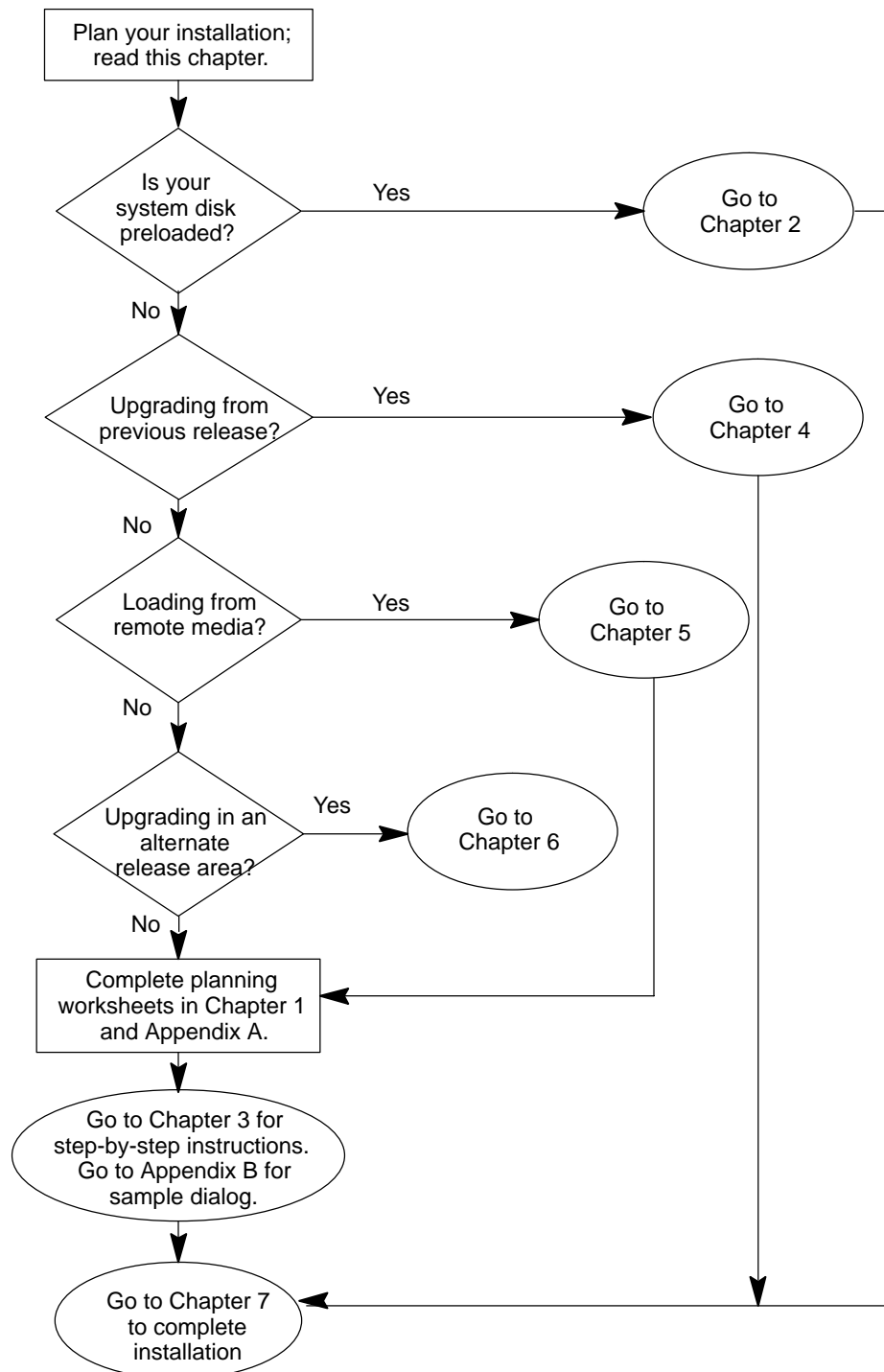


Figure 1-1 Reading path for installation tasks

Using the planning worksheets

Appendix A contains ***planning worksheets*** for recording the information you need to install or upgrade your system. This chapter helps you complete the planning worksheets.

Planning accelerates the installation or upgrade process. If you don't have certain information on hand when prompted, it disrupts the installation procedure. Providing incorrect information during installation may force you to abort the process and begin again.

We recommend that you make copies of the planning worksheets in Appendix A to write on while collecting the information required for installation. Save the completed planning worksheets as a record of your system's configuration; they will be useful when you or someone else upgrades your DG/UX system in the future.

Verifying prerequisites

Take a moment to be sure you are ready to install the DG/UX system software on your computer system. This section helps you complete **planning worksheet 1** in Appendix A.

Does your system have an SCM?

Two types of AViiON systems are available: models with a System Control Monitor (SCM) that boot directly from the SCM prompt and do not require a boot floppy, and models without an SCM that require a boot floppy to install the DG/UX software. If you did not purchase a preinstalled system, you need to know whether your computer model requires the boot floppy to install the DG/UX software. Refer to your notice to determine if your computer model comes with an SCM.

- After you determine whether or not your computer has an SCM, **check the appropriate block on worksheet 1** in Appendix A.

Are you installing or upgrading?

To perform an installation, your system disk must be newly formatted or contain only files that can be overwritten.

During a new installation:

- The release files overwrite any files of the same name currently on the system disk.
- You create the required and optional virtual disks (see your notice for a current list of required and optional virtual disks).

During an upgrade:

- You maintain customized operating system files.
- Your required virtual disks already exist; you create additional virtual disks optionally.
- Your system disk already contains a DG/UX kernel configured for the device you'll use to load the release media. (When using a remote load device, the local device is your computer's LAN controller.)

- After you verify that your system satisfies either upgrade or install prerequisites, **check the appropriate block on worksheet 1** in Appendix A.

Does your computer have sufficient physical memory?

The minimum physical memory requirement for your system is specified in the notice for your system.

Your system must be equipped with a minimum of physical memory to perform an installation or an upgrade. This amount of memory is necessary to accommodate all the software packages and to support stand-alone **sysadm**.

To find out your computer's physical memory size, check your screen at powerup. Powerup messages report the physical memory size.

- After you verify that your computer has sufficient main memory, **check the appropriate block on worksheet 1** in Appendix A.

Do you have any disks in addition to your system disk?

If you have any physical disks you intend to use for user data in addition to those needed to install the DG/UX system, you should format them *after* you complete your installation. When you have set up the documentation CD-ROM, you can refer to *Managing Mass Storage Devices and DG/UX[®] File Systems* for the procedures to format those disks and create the necessary virtual disks and system files.

Are you loading operating systems in addition to DG/UX?

If you plan to install an operating system (such as MS-DOS[®]) in addition to the DG/UX system on your machine, you should load the other operating system first, *before* installing the DG/UX software. Refer to your third-party software documentation to install other operating systems. Be careful not to allow the third-party software to expand and take up the whole disk.

- Complete installation of operating systems other than DG/UX on the system disk and verify that enough space remains to install the DG/UX system software, and then **check the appropriate block on worksheet 1** in Appendix A.

Do you have a dual-initiator disk configuration?

To set up a dual-initiator disk configuration (in which two or more host computers share a single SCSI bus), you must set SCSI bus operating parameters *before* you boot the DG/UX system on the local host. For instructions on how to set these parameters, **refer to the 014-series operating manual for your hardware model.**

Be sure to check the SCSI bus parameters every time you install or upgrade the DG/UX software. Note that you must set the parameters *before* booting a DG/UX installer kernel or autoconfigured DG/UX custom kernel. If for some reason you cannot set the parameters first, you may have to shut down the remote host or disconnect the shared SCSI bus from the local host before booting such a kernel.

IMPORTANT Do not boot a DG/UX installer kernel or an autoconfigured DG/UX custom kernel in an active dual-initiator configuration before setting the SCSI bus operating parameters. Unset or improperly set parameters will cause a system halt on the DG/UX system on the remote host.

Examples of common dual-initiator disk configurations are DG/UX Cluster configurations. If you plan to install the DG/UX Cluster Software product, you will generally need to modify the default configuration. Refer to your DG/UX Cluster documentation for details.

- After you complete preparations for dual-initiator or DG/UX cluster configurations, **check the appropriate block on worksheet 1** in Appendix A.

If you do not intend to use the default configuration

If you set up the **/var** file system separately from the **/** (root) file system, you will not be able to boot to init 3. This is because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following two lines to your **/etc/inittab** file to mount the independent **/var** file system:

```
mnt::sysinit:/sbin/fsck -pxl /var </dev/console >/dev/console 2>&1
var::sysinit:/sbin/mount /var </dev/console >/dev/console 2>&1
```

You must add these lines immediately after the line defining the default run level (that line starts with **def** and looks similar to this: **def:3:initdefault:**). You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

Identifying boot, load, and system disk devices

This section helps you complete **planning worksheet 2** in Appendix A.

To install or upgrade the DG/UX system, you need to know the name of:

- The device from which you will start the installer program (the *boot device*).

IMPORTANT If you are loading the DG/UX system on a machine that doesn't include an SCM, you may need to use a boot floppy to load the DG/UX release medium.

- The device from which you will load the contents of the release medium (the *load device*).
- The disk to which the contents of the release medium will be loaded (the *system disk*).

You can use any of the devices listed in Table 1–2 to boot stand-alone **sysadm** and load DG/UX release software.

Table 1–2 Device names required for installation or upgrade

Boot Device	Description
Local CD	CD-ROM drive attached to a local host
Bootable Ethernet LAN controller	Network device through which you access a remote load device

IMPORTANT If you are installing or upgrading over a network, complete the steps in Chapter 4, or **planning worksheet 3** in Appendix A.

- Record the names of your boot, load, and system disk devices on **planning worksheet 2** in Appendix A. Refer to your notice for a list of typical local boot device and system disk names for Intel-based systems.

Refer to *Managing Mass Storage Devices and DG/UX® File Systems* and your hardware manual for details on understanding device name syntax.

Selecting software packages and suites

This section gives an overview of the contents of the DG/UX release medium — the software in the software packages and package suites. You can select one or more individual software packages and package suites for installation.

If limited disk space is an issue, you can choose to load only the packages you need. The only package that you *must* load is **dgux**, plus your **B2** or **C2** security package, if applicable. To save space, you may choose not to load some of the manual pages (the software packages that end with the **.man** extension). However, we strongly recommend that you load the **dgux.man** package.

You may prefer to load only essential packages during installation, and then add others later. For information on using stand-alone **sysadm** to load additional software packages after DG/UX installation, refer to the instructions on loading and setting up application software in *Managing the DG/UX® System*.

- **On worksheet 6 in Appendix A, enter the names of the packages you will install or upgrade.**

DG/UX software packages

The DG/UX software packages are available with all DG/UX system software options, including the DG/UX information security products. See your DG/UX notice for a list of the DG/UX software packages included with your system.

Security software packages

The DG/UX B2 and C2 information security products are supersets of the DG/UX system software. See your notice for a list of the security software packages included with your system.

Manual page packages

Most software components include formatted, online manual pages, sometimes also called man pages. A manual page describes the attributes for each command, system call, library function, or special file for each software component.

Data General does not provide manual pages in a hard-copy book. You must load the software packages that end with the extension **.man** to include manual pages on your system for online viewing.

Depending on the DG/UX system option you purchase and the software packages you choose to install, you can install a variety of packages of manual pages during installation. See your notice for a complete listing of the available man page packages.

Software package suites

For your convenience and ease of installation, selected software packages on the DG/UX release medium are grouped into package suites. Installation of a suite installs all individual packages that are part of that suite, saving you the time and effort involved in selecting those individual packages. You can choose to install individual packages and package suites during an installation.

See your notices for a list of software package suites that are available for loading from your installation media.

Planning your system disk layout

Read this section for an introduction to concepts you need to understand when allocating disk resources and completing **planning worksheets 4 and 5** in Appendix A.

About physical and virtual disks

When installing the DG/UX system, you create areas on a physical disk (*partitions*) to contain the software packages copied from the release medium. Data General's term for a named area of one or more disk partitions is *virtual disk*.

The *system disk* is the physical disk (or disks) that contain(s) the virtual disks required for the DG/UX system software.

Although the DG/UX system recognizes many PC partition styles, it offers its own style of PC partition over which the virtual disk layout is superimposed. If you plan to install another operating system in addition to the DG/UX software, you should use your third-party documentation and software to create the necessary PC partitions and load these operating systems *before* attempting to install the DG/UX system.

Required virtual disks

The DG/UX system requires the **swap**, **root**, and **usr** virtual disks to operate. You create the three required virtual disks at the beginning of the installation process.

The **root** virtual disk requires a minimum number of blocks *on one physical disk* (see your notice for the minimum block size). If you are upgrading (overloading), **sysadm** attempts to enlarge the **root** virtual disk to this size. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space.

If you install optional software packages that ship with the DG/UX system, the installer program creates additional standard virtual disks, which are listed in your notice. You create the additional virtual disks during the package load phase of installation.

Although it is optional, we recommend you also create a virtual disk for a specific dump-to-disk area. This dump-to-disk area may be created on any available SCSI system disk that is physically attached to the system, and should be called **dump**. The installer utility will ask you if you want to create this virtual disk for dumps and will recommend a size based on your system memory.

IMPORTANT For details about the standard virtual disks required for installation, **refer to the notice for your DG/UX product.**

After installing the DG/UX system, you may create other virtual disks to accommodate your applications. For detailed information on virtual disks and customizing your installation, refer to *Managing Mass Storage Devices and DG/UX® File Systems*.

Partitioned and aggregated virtual disks

The DG/UX system measures virtual disks in 512-byte disk blocks. You create a virtual disk partition by selecting a contiguous stretch of blocks on a physical disk.

You create an aggregated virtual disk (*aggregation*) by combining partitions (located on the same physical disk, or different physical disks) in a single virtual disk.

You may expand **root** and **usr** using additional *noncontiguous* partitions as long as they reside on the same physical disk. A virtual disk used for swapping may span multiple physical disks.

IMPORTANT You cannot boot stand-alone programs such as the DG/UX kernel and/or stand-alone **sysadm** from a virtual disk that spans multiple physical disks.

After you complete the installation, refer to *Managing Mass Storage Devices and DG/UX® File Systems* for information on using virtual disk partitions.

About local file systems and mount points

A *file system* organizes virtual disk space into a hierarchical structure containing the DG/UX system software. With the exception of the **swap** and optional **dump** virtual disks, the installer utility automatically creates a file system structure within a required virtual disk.

A *mount point* identifies an absolute location within the DG/UX file system for a particular virtual disk's file system. You specify a directory location (mount point) at which to mount the file system that resides on a particular virtual disk.

Figure 1-2 shows a typical DG/UX file system with standard virtual disks and their mount points.

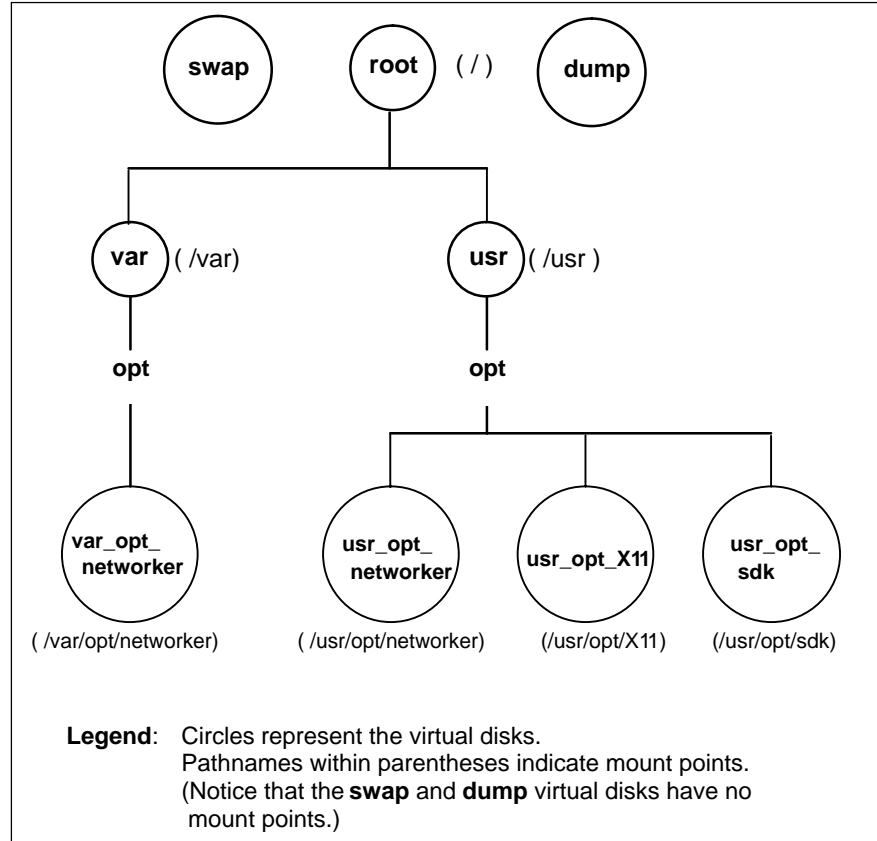


Figure 1-2 Sample virtual disks and mount points on the DG/UX file system

Viewing the layout of a physical disk

You can view a physical disk's layout before you take the system down for an upgrade, or after you install the DG/UX system.

View the layout of virtual disks on a physical disk through the **sysadm** operation Device -> Disk -> Physical -> List or with the **admpdisk** command. After you complete the installation, refer to *Managing Mass Storage Devices and DG/UX® File Systems* for information on options.

To maintain compatibility with other Intel-based operating systems and to support BIOS boot operations, disks are divided using PC partitions. The hard disk has a Master Boot Block on the first block which contains a table that can define up to four PC partitions on the disk. Each PC partition created has a partition type. Some examples of PC partition types are **DOS4.x**, **DOS_ext**, **OS2_hpfs**, and **DGUX_vdm**.

In the following example from an AV 2000 system, we use the command **admpdisk -o list -P sd(apsc(pci(0),b),0,0)** to show a **DOS4.x** bootable partition starting at block 32 and a **DGUX_vdm** partition starting at block 512000.

Disk name	State	Reg?	Format	Total blocks	Free blocks
sd(apsc(pci(0),b),0,0)	avail	y	vdisk	2055035	484563

PC Partition ID	Boot State	Address	Size
.Reserved	n/a	1	31
DOS4.x	Non-Boot	32	511968
DGUX_vdm	Boot	512000	1543008
.Reserved	n/a	2055008	27

The DG/UX software creates all of its virtual disks within the PC partition **DGUX_vdm**.

In the next example from an AV 2000 system, we use the command **admpdisk -o list -a sd(apsc(pci(0),b),0,0)** to show the Master Boot Block on the first block of the disk, the DOS4.x partition from block 32 through 511968. The rest of the disk with the exception of .Reserved,00000004 and .Reserved,00000007 are DG/UX virtual disks and <free space> all contained in the **DGUX_vdm** PC partition. Note that the **admpdisk** command automatically created .Reserved,00000004 and .Reserved,00000007 virtual disks to satisfy the requirement that PC partitions start on a cylinder boundary.

Disk name	State	Reg?	Format	Total blocks	Free blocks
sd(apsc(pci(0),b),0,0)	avail	y	vdisk	2051000	491839

Name	Role	Address	Size
.Master_Boot_block,00000003		0	1
.Reserved,00000004		1	31
PC_Partition_DOS4.x		32	511968
.Bootstrap_3		512000	1
.Primary_Vdit		512001	16
.Primary_Bad_Block_Table		512017	2
.Remap_Area		512019	100
.Secondary_Bad_Block_Table		512119	2
Part of swap	Piece 1 of 2	512121	50000
root		562121	60000
usr		622121	280000
usr_opt_X11		902121	90000
usr_opt_networker		992121	30000
usr_opt_sdk		1022121	50000
var_opt_networker		1072121	10000
.NDB		1082121	50000
.Bootstrap_4		1132121	40000
.Bootstrap_5		1172121	280000
Part of swap	Piece 2 of 2	1452121	50000
dump		1502121	57000
<free space>		1559121	491839
.Secondary_Vdit,00000009		2050920	16
.Reserved,00000007		2050936	24

Preparing physical disks

This section helps you complete **planning worksheet 4** in Appendix A.

At the beginning of the installation process, **sysadm** prompts you to prepare the physical disk drives in your configuration for installation.

Preparing a physical disk verifies or installs the following:

- A DG/UX PC partition.
- Virtual disk information tables.
- An up-to-date bootstrap.
- Bad block remapping.
- A non-volatile RAM (NVRAM) database).

You *must* prepare any physical disks that contain the DG/UX operating system.

Do not prepare read-only physical devices such as CD-ROM or WORM (Write-Once Read-Many) drives; these devices remain in logical disk format (*compatibility mode*).

IMPORTANT You can prepare all physical disk devices *unless* you have read-only devices in your configuration.

- **Record device names of the physical disks to prepare during installation on worksheet 4 in Appendix A.**

Changing virtual disk and mount point defaults

This section helps you complete **planning worksheet 5** in Appendix A.

Your notice lists the minimum required sizes and mount points for standard DG/UX virtual disks. You may need to increase these sizes to suit your system's configuration, but you must adhere to the minimum requirements described in the notice.

Before beginning an upgrade, you can expand the size of any existing virtual disk simply by adding contiguous space or noncontiguous partitions. You can add noncontiguous partitions to **root** and **usr** as long as they reside on the same physical disk. A virtual disk used for swapping can span multiple physical disks.

If you are upgrading (overloading), **sysadm** attempts to enlarge the **root** virtual disk to its minimum required size. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space.

- **Read the following subsections to decide if the default virtual disk sizes are appropriate for your installation. The last subsection provides information on renaming virtual disks.**

Sizing a virtual disk for swap space

The DG/UX system needs at least one virtual disk for use as swap space. A swap area's virtual disk differs from others in that it does not have a file system.

The amount of swap space you require depends on your platform, the amount of physical memory in your computer, the nature and number of the applications you intend to run, and the number of users on the system. If your programs allocate large portions of memory, you may need more swap space.

A typical server operates comfortably with swap space that is 1.5 times the size of physical memory. Thus, a computer with 32 megabytes of memory requires at least 48 megabytes of swap space.

You calculate the required number of blocks using the following formula:

$$(1.5 \times (\text{physical-memory-in-megabytes} \times \text{bytes-per-megabyte})) / \text{bytes-per-block} = \text{blocks}$$

For example, a server with 32 megabytes of memory requires roughly 100,000 blocks of swap space:

$$(1.5 \times (32 \text{ megabytes} \times 1048576)) / 512 \text{ bytes/block} = 98304 \text{ blocks}$$

Bear in mind that this estimate for swap space is a recommendation for a new system. Calculating the precise swap space is a function of the demands presented by your particular configuration — software applications and number of OS clients, for example. After your system is fully functioning, you may need to recalculate swap space using additional advice given in *Managing the DG/UX® System*.

You may create an aggregated virtual disk, which spans multiple physical disks, or you may create multiple swap area virtual disks, such as **swap1** and **swap2**, to supplement existing **swap** virtual disk space. See *Managing the DG/UX® System* for more information on adding swap space.

IMPORTANT See your notice for details on the minimum required **swap** size.

- **Record the size to make the swap virtual disk on worksheet 5 in Appendix A.**

Sizing the virtual disk for the / (root) file system

The / file system is reserved for system-level programs and facilities. The / directory holds subdirectories that contain information and configuration files, system commands, temporary system files, spool files, and symbolic links to other subdirectories.

See your notice for the minimum required size of the **root** virtual disk. Sites with adequate disk space will benefit from increasing the size of **root** by 10,000 blocks or more.

IMPORTANT If you are upgrading (overloading) your DG/UX system and **root** is smaller than the minimum required block size, **sysadm** attempts to enlarge the **root** virtual disk to the minimum size. The **root** virtual disk *must be on one physical disk*. If your disk does not have enough free blocks available to enlarge **root** sufficiently, you will need to move, delete, or shrink another file system on **root**'s disk, or move **root** to another physical disk with enough available space.

- **Record the size to make the root virtual disk on worksheet 5 in Appendix A.**

Sizing the virtual disk for the /usr file system (usr)

The minimum required block size for the **usr** virtual disk is listed in your notices. Sites with adequate disk space will benefit from increasing the size of **usr** by 10,000 blocks or more.

The **/usr** file system is reserved for system-level programs, facilities, and software packages. The **/usr** directory holds subdirectories that contain database and configuration files, administrative commands, stand-alone utilities and bootstraps, and user commands. You create the **usr** virtual disk and load the appropriate file system.

You cannot boot stand-alone programs from a virtual disk that spans multiple physical disks. Creating the **usr** virtual disk in two or more partitions on different physical disks means you cannot boot any bootable image (such as stand-alone **sysadm**) or diagnostics from **usr**.

- **Record the size to make the **usr** virtual disk on worksheet 5 in Appendix A.**

Sizing the virtual disk for the dump-to-disk area (dump)

The installer utility uses an algorithm to determine how much space to allocate to the dump-to-disk area as a default value. The algorithm is based on your memory configuration.

The installer utility will ask if you want to create a **dump** virtual disk and will offer a default value appropriate for your system. Since this virtual disk is optional and the utility does the sizing for you, you don't need to record anything at this time.

IMPORTANT The DG/UX operating system does not support dumping over the network.

Sizing the virtual disk for the /usr/opt/X11 file system (usr_opt_X11)

See your notice for the minimum required size of the **usr_opt_X11** virtual disk.

The **/usr/opt/X11** file system is reserved for the DG/UX X Window System package, which includes X11, the OSF/Motif window manager, and online documentation. This **usr_opt_X11** virtual disk is required only if you intend to install the DG/UX X Window System.

- **Record the size to make the **usr_opt_X11** virtual disk on worksheet 5 in Appendix A.**

Sizing the virtual disk for the /usr/opt/sdk file system (usr_opt_sdk)

See your notice for the minimum required size of the **usr_opt_sdk** virtual disk.

The **/usr/opt/sdk** file system is reserved for the Software Development Kit (SDK) package, which includes many important programming tools and most system headers. The **usr_opt_sdk** virtual disk is a necessary component for virtually all software development on the DG/UX system.

- If you plan to load SDK software, record the size to make the **usr_opt_sdk** virtual disk on worksheet 5 in Appendix A.

Sizing the virtual disk for the /usr/opt/networker file system (usr_opt_networker)

See your notice for the minimum required size of the **usr_opt_networker** virtual disk.

The **/usr/opt/networker** file system is reserved for the Data Backup Utility for DG/UX (DBU), which is an application for disk backup. DBU enables a system to back up its own disks to a local backup device.

- If you plan to load DBU software, record the size to make the **usr_opt_networker** virtual disk on worksheet 5 in Appendix A.

Sizing the virtual disk for the /var/opt/networker file system (var_opt_networker)

If you intend to use your system as a DBU or NetWorker server, you must create the **var_opt_networker** virtual disk to accommodate the online index of backed-up files and logfiles. If you intend to use your system as a client of a remote NetWorker server, you do not need to create the **var_opt_networker** virtual disk.

See your notice for the required minimum size of the **var_opt_networker** virtual disk.

You calculate the size to make the **var_opt_networker** virtual disk according to these factors:

- The number of files to be backed up.
- The browse period (how long you keep online the indexes for each backup).
- The number of full backups performed during the browse period.
- The number and average size of incremental backups performed during the browse period.

DBU and NetWorker require approximately one block of online index space for every two files they back up. Different versions of backed-up files count as separate files. For example, if two given files are backed up on a monthly full backup, and also on each of four weekly full backups, five blocks are required for those two files.

By default, online indexes for backed-up files are recycled (discarded and reused) after one month. If you choose a longer browse period (for example, quarterly), you will need more disk space. You can decrease the index space requirements by shortening the browse period, by reducing the number of backups within the browse period, or by replacing full backups with incremental backups.

A rule of thumb for determining index space is to estimate the total number of files in all file systems you plan to back up, and allow two blocks for each file. This is enough space for four distinct backup versions of each file. You may need to experiment over time to determine the best index size for your site.

- **If the default size for `var_opt_networker` is insufficient, record the size to make the virtual disk on worksheet 5 in Appendix A.**

Changing the name of a virtual disk

We recommend that you adopt a naming scheme that identifies the mount point of the file system contained on a virtual disk. The mount point identifies a location for placing the virtual disk's file system. For example, the virtual disk name **usr_opt_X11** implies the mount point for its contents, **/usr/opt/X11**.

IMPORTANT We recommend that you *not* rename the virtual disks for software installed from DG/UX release medium. If you do, each time you boot the DG/UX system, you will be prompted for the names of the virtual disks containing **swap** and the **/** file system. See the **admpdisk(1M)** manual page for information on permanently changing the default name for these virtual disks.

You name virtual disks using a combination of as many as 31 alphabetic characters, numbers, and various punctuation characters and symbols.

Table 1-3 lists the ISO-8859 characters you *cannot* include in a virtual disk name.

Table 1–3 Illegal characters in virtual disk names

ISO–8859 Character	Description
\000 through \037	ASCII control characters
	space
"	double quote
'	single quote
(left parenthesis
)	right parenthesis
,	comma
/	slash
:	colon
@	at sign
\177	ASCII DEL
\200 through \237	undefined characters

After you complete the installation, you can refer to *Managing Mass Storage Devices and DG/UX[®] File Systems* for more information on virtual disk names.

Collecting package information

This section helps you complete **planning worksheet 7** in Appendix A.

During package setup, you must indicate if the system is a DG/UX cluster node, and provide configuration information to set up the Data Backup Utility, ONC, and TCP/IP packages. Setting up other DG/UX packages is not interactive. In the next sections, you collect setup information for these three packages.

DG/UX cluster package information

During the package setup part of installation, a prompt asks if the system will run as a node within a DG/UX cluster:

```
Will this system be running as a node within a cluster? [no]
```


The DG/UX Cluster Software product simplifies the management of services and resources such as disks, printers, and file systems in a multi-computer environment. If you plan to purchase and install DG/UX Cluster Software, you must answer **yes** to this prompt. Answering **yes** does preliminary setup that will allow your DG/UX installation to work in a DG/UX cluster.

Answer **no** to this prompt if you do not plan to purchase and install DG/UX Cluster Software.

- **Decide whether or not the system will be a DG/UX cluster node and record your answer on worksheet 7 in Appendix A.**

Data Backup Utility package information

How you set up the Data Backup Utility (DBU) product for DG/UX depends on whether you are installing your system as a local-only backup server (your system backs up its own files), or as a client of a remote server that runs the multi-server version of Legato NetWorker.

You must answer the following question during package setup:

Configure system as a client of a remote NetWorker server?

A **no** response sets up the DBU software to backup your file systems to a local tape drive. Answer **no** unless your system is a client of a remote NetWorker server.

Answer **yes** if the multi-server version of NetWorker runs on a remote NetWorker server, and you want to configure this system as a NetWorker client to be backed up by that system.

- **Record the Data Backup Utility information on worksheet 7 in Appendix A.**

ONC package information

If you plan to install the ONC package, you must supply the Network Information Service (NIS) domain name during the installation process.

NIS domain name

By default, the directory `/etc/yp/domain-name` contains a named set of NIS maps. Hosts with this directory as their default NIS domain share the information found in its maps.

If you are installing a new computer in an existing network, use the **domainname** command to find out the network's NIS domain name.

- ► **Record the NIS domain name on worksheet 7 in Appendix A.**

After you complete the installation, refer to *Managing ONC/NFS and Its Facilities on the DG/UX[®] System* for more information on ONC parameters.

TCP/IP package information

When you install the TCP/IP package, you must supply your host's name, Internet address with subnet mask (if applicable), and the Ethernet controller device name.

You need not gather and supply this TCP/IP package information if you want to retain the existing TCP/IP parameter settings. During a new installation or an upgrade, the TCP/IP parameters already defined on your system are used as defaults.

- ► **Record TCP/IP information on worksheet 7 in Appendix A.**

Follow the next subsections to collect the required information. After you complete the installation, you can refer to *Managing TCP/IP on the DG/UX[®] System* for more information about TCP/IP parameters.

Hostname

Choose a unique name for your computer hardware that contains no more than 63 alphabetic and numeric characters. Hostnames that relate to the use or location of the system are particularly helpful in networked environments where hosts may share file systems.

Do not use the capitalized names **MY_HOST** or **PRIMARY**; these names are reserved by the system. Examples of hostnames are **fred**, **jamaica**, and **cad1**.

If you are upgrading, use the **hostname** command at each host to determine current hostnames.

Internet address

Your network's system administrator can supply the Internet address of the host being set up. An example of an Internet address is **128.222.2.1**. After you complete the installation, you can refer to *Managing TCP/IP on the DG/UX[®] System* for more information.

If you are upgrading, you can determine your host's Internet address using one of the following methods:

- View the **/etc/hosts** file.
- Use the **ypcat** command:
% **ypcat hosts | grep hostname** ↵
- Use the **arp** command:
% **arp hostname** ↵

Do you subnet?

Using a subnet allows you to associate multiple physical networks with a single logical network. Answer **yes** if your network uses subnetting; answer **no** if you do not subnet.

Network mask

A network mask is required only when your network is subnetted.

Specify the hexadecimal bit pattern that identifies the network portion of an Internet address in your network.

Examples of network masks are **0xff000000** and **0xffff0000**.

Controller device name

When your computer contains two or more Ethernet LAN controllers, you must specify a device that connects your computer to a TCP/IP LAN.

You identify controllers by the controller type and controller number, using the form *controller-type controller-num*. For a list of Ethernet LAN controller device names, refer to your notice. ■

IMPORTANT DG/UX also supports non-Ethernet controllers. You set up token ring or FDDI controllers after installation.

Where to go next

If you are**Go to**

Completing installation of a preloaded system.

Chapter 2

Installing DG/UX generic and information security software from a local CD-ROM device.

Chapter 3

Upgrading from a previous DG/UX release (with or without an installed maintenance update) to the current DG/UX release.

Chapter 4

Installing or upgrading from a remote load device.

Chapter 5

Installing or upgrading in an alternate release area.

Chapter 6

End of Chapter

2

Completing installation of your preloaded system

Your computer is *preloaded* if it came from the factory with the DG/UX system software loaded on the system disk. Preloaded systems come with the latest complete version of the DG/UX system software.

See your notice for information about the contents of your preloaded disk. Most preloaded systems can be up and running in 30 minutes or less. ■

The DG/UX manuals and software to view them are on the DG/UX documentation CD-ROM. You can view the contents of the documentation CD-ROM on a PC running Microsoft Windows or Windows NT. For how to set up the software and view the DG/UX manuals, refer to the documentation provided with the CD-ROM.

IMPORTANT If your system is *not* preloaded, refer to Chapter 3 to do a full or clean installation, or Chapter 4 to do an upgrade or overload installation.

This chapter includes the following major sections:

- Collecting installation parameters
- Setting SCSI bus parameters for a dual-initiator configuration
- Powering on your hardware computer system
- Selecting packages
- Setting up selected packages
- Building and booting a configured kernel
- Where to go next

In this chapter, you follow the sequence of tasks shown in the flowchart in Figure 2-1.

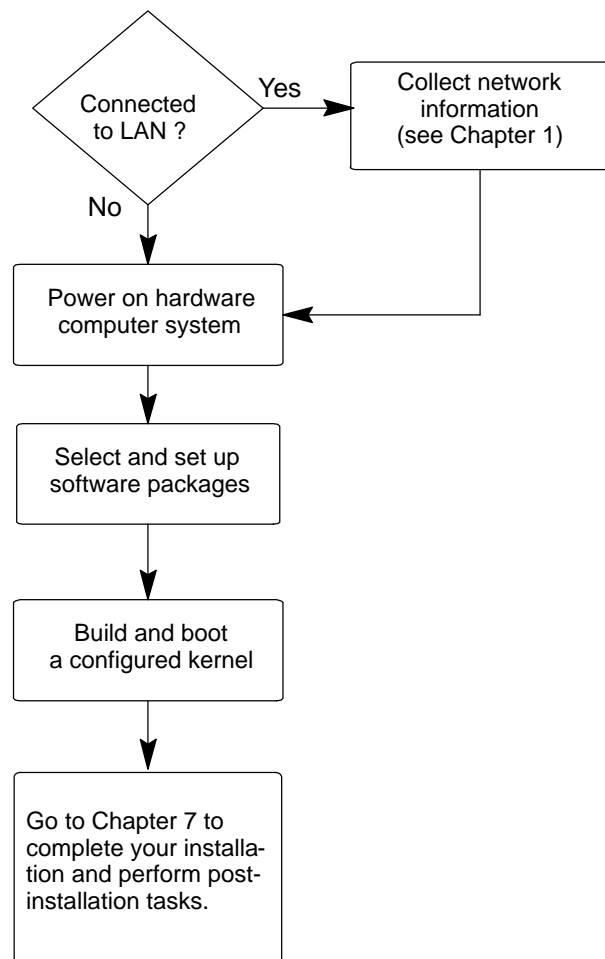


Figure 2-1 Installation procedure for a preloaded system

IMPORTANT For dual-initiator disk configurations (in which two or more host computers share a single SCSI bus), make sure SCSI bus operating parameters are set properly *before* you begin the installation. For more information see the section on setting SCSI bus parameters for a dual-initiator configuration, later in this chapter.

Collecting installation parameters

If you will install the Data Backup Utility, ONC, or TCP/IP packages, you need the information in Table 2–1. Go to Chapter 1 if you need help collecting this information. Record this information here or on planning worksheet 7 in Appendix A.

Table 2–1 Installation parameters

DG/UX Installer prompt	Example Response	Actual
Client for remote NetWorker server?	no	
(For NetWorker server only) Size of /var/opt/networker	10000	
NIS domain name	worknet	
Hostname	moe	
Host Internet address	123.222.2.1	
Do you subnet?	yes	
Network mask	0xffffffff00	
Controller device name (if computer has more than one Ethernet controller)	alen(), dpen(), tcen()	

Setting SCSI bus parameters for a dual-initiator configuration

IMPORTANT This section applies only to systems with a System Control Monitor (SCM).

When you add a preloaded system to a dual-initiator configuration, you need to perform some special preparation before installing the DG/UX system on that host. We refer to the host on which you boot or install the DG/UX system as the “local” host. We will call the other host(s) in the local host’s dual-initiator configuration, the “remote” host(s).

The SCSI bus operating parameters should be set *before* you boot the DG/UX system on the local host. For instructions on how to set these parameters, **refer to the 014-series operating manual for your hardware model.**

Note that in a dual-initiator disk configuration, one SCSI bus cable connects two computer systems, either directly or (more commonly) daisy-chained through one or more SCSI disk devices such as a CLARiiON™ disk array, or through a SCSI hub.

For example, common dual-initiator disk configurations are DG/UX cluster configurations and multi-building block NUMA systems, such as the AV/20000.

To set the SCSI bus operating parameters, your system must be equipped with a System Control Monitor (SCM). If you are not sure if you have an SCM, refer to the DG/UX notice that came with your system.

To set the SCSI bus operating parameters, you must interrupt the boot process before the DG/UX installer kernel starts. To do this, you can enter **Ctrl-C** any time after the powerup diagnostics have completed and the DG/UX bootstrap is running. This will bring you to the SCM prompt.

The powerup diagnostics are complete when the system displays the following self-test information:

```
Testing...
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
Passed
```

IMPORTANT If your server does not complete the self-test or displays error messages, do not attempt to complete the installation. Refer to your hardware manual for troubleshooting information.

Once the powerup diagnostics are complete, the system displays a message similar to the following DG/UX bootstrap message:

```
DG/UX System Release Rn.nn Bootstrap
Loading image .....
```

You may enter **Ctrl-C** any time after the DG/UX bootstrap displays the first line of the message. However, you must interrupt the bootstrap *before* the system completes this operation. If the system displays the following message, the bootstrap is complete and you can no longer interrupt the system boot:

```
Configuring devices ...
```

Once you are at the SCM prompt, you can check your system's SCSI bus operating parameters.

IMPORTANT If you fail to interrupt the bootstrap before it completes, turn off your computer immediately. Since the DG/UX system does not begin writing to disk devices until after it has finished configuring all devices, you will not corrupt any data on your disks. Wait a few seconds until your computer has reset, and then try again.

Powering on your hardware computer system

If you want to run a third-party operating system (e.g., MS-DOS®) in addition to the DG/UX software on your machine, we recommend you first complete the installation of your preinstalled software, and then follow the directions for adding a third-party operating system in the post-installation tasks of Chapter 7.



Turning on the power to the computer begins a process that you cannot interrupt gracefully! If you plan to install the Data Backup Utility, ONC, or TCP/IP, don't continue until you have collected the information in Table 2-1 (or planning worksheet 7 in Appendix A).

► To begin installation, follow these steps:

1. Turn on power to the system console and any other devices that are connected to your computer.

A printer, modem, or peripheral housing unit (PHU) are all examples of such devices. For diskette, optical disk, or other devices that require a removable recording medium, be sure the drive contains media and is ready.

CAUTION If you have a WORM (Write-Once Read-Many) device in your configuration, power down the device to prevent the installation utility from preparing (writing) that disk. A write operation to a WORM disk can inadvertently destroy its contents.

2. Turn on the computer unit's power switch.

Your computer executes self-tests and displays information similar to the following example:

```
Testing.....
0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
Passed
```

IMPORTANT If your computer displays error messages or does not complete the self-tests satisfactorily, do not continue the installation. Go to your computer hardware operating manual for troubleshooting procedures.

Once self-tests pass successfully, your computer boots the installer utility (a DG/UX system kernel configured with standard devices), displaying information similar to the following.

```
Booting sd(apsc(pci(1),f),0) root -f /dgux.installer -i
DG/UX System Release Rn.nn Bootstrap
Loading image .....
DG/UX System Release Rn.nn Version Installer
Using 32 megabytes of physical memory
Found 2 processor(s)
Configuring devices .....
Registering disks ..
Using vdm(swap,2ccc0ele,373a2f18,0) as swap disk
No check necessary for vdm(root,2ccc0ele,373a2718,0)
Mounting vdm(root,2ccc0ele,373a2718,0) as root file system
Creating /dev ....

INIT: RUN LEVEL I
```

IMPORTANT The physical disk names may vary slightly depending on the computer model.

Read the next section to select software packages.

Selecting packages

The DG/UX installer program prompts you to select the software packages to set up:

```
Set up packages? [development] ↵
```

See your notice for a description of each package. ■

3. Decide whether to set up all packages or to specify them individually.

- **To set up all the packages that were loaded, press Enter and go to the next step.**

```
Package Name(s): [development] ↵
```

- **To set up packages individually, list them by entering a question mark (?). For example:**

```
Package Name(s): [development] ? ↵
```

A screen similar to the following appears.

```
Select the package(s) you want to set up.  If you want
to set up all packages select 'all,' do not select any
individual package names.
```

Choices are ■

```
[...choices display here...] ■
```

```
Enter a number, a range of numbers (n-m, where m can
be '$' to indicate the last item), a name, the initial
part of a name, <NL> to take the default, ? for help,
^ to return to the previous query, < to restart the
operation, or q to quit.
```

```
Package Name(s): [development]
```

Next, specify the individual packages you want to set up, using the full names or corresponding numbers of the packages in the list. Separate each name or number by commas or spaces. You also may use a dash to specify a range of package numbers. For example, you might select the following:

```
Package Name(s): [all] 2, 4-6, 9, 10 ↵
```

The system will list the selected packages and ask you to verify your selection. For example:

You selected the following packages:

```
[...Selected packages display here...]
```

```
Correct? [yes] ↵
```

```
OK to perform operation? [yes]
```

4. **To start the setup scripts for selected packages, press Enter. If you wish to modify your selection, answer no and repeat the process. When you are satisfied with your selections, press Enter as shown below:**

```
OK to perform operation? [yes] ↵
```

Status messages are displayed during setup; a message appears when setup has been completed successfully. Packages are set up in alphabetical order.

Although the setup of DG/UX is not interactive, the system displays status messages during setup and reports successful completion.

If the setup of a particular package fails, the utility informs you with a warning message. Write down the message, and refer to Appendix D for troubleshooting help.

Setting up selected packages

For most packages, the setup process is not interactive. However, if you selected the **networker**, **onc**, or **tcpip** packages, you must provide information when prompted.

A detailed account of each package's setup is logged in a file whose name takes the general form `/var/setup.d/log/package.root` or `/var/setup.d/log/package.usr`.

CAUTION Providing incorrect answers to configuration queries may force you to abort the remaining installation procedures.

5. **Read system-generated messages during package setup, especially those labeled NOTE and WARNING.**

Setting up the DG/UX packages only (no network packages) takes about 8 minutes. It takes a bit longer to set up all of the packages.

6. **Determine how to proceed by reviewing this step carefully.**

- If you did not select any of the three optional packages (**networker**, **onc**, or **tcpip**), go to the section on building and booting a new kernel and proceed with **step 19**.

- ▶ If you selected the **networker** package, go to the following section on answering Data Backup Utility questions and proceed with **step 7**.
- ▶ If you did not select **networker**, but selected **onc**, go to the section on answering ONC questions and proceed with **step 16**.
- ▶ If you selected **tcpip**, but neither **networker** nor **onc**, go to the section on answering TCP/IP questions and proceed with **step 18**.

Answering Data Backup Utility questions

How the installer program sets up Data Backup Utility depends on whether you are setting up your system as a local-only backup server (your system backs up its own files) or as a client that will back up its files to a remote NetWorker server.

7. Decide if this host backs up its files to a remote NetWorker server or if it is a local-only backup server.

- ▶ If this host backs up files to a remote NetWorker server, type **yes** and press Enter. For example:

Table 2-1 or
planning
worksheet 7

```
Configure system as a client for a remote NetWorker
server? [no] yes ↵
```

If you answer **yes**, there are no more questions about this package.

- If you are setting up the **onc** package, go to **step 16**.
- If you are setting up **tcpip** but *not* the **onc** package, go to **step 18**.

- ▶ If this host will back up its own files locally, accept the **no** default by pressing Enter. For example:

```
Configure system as a client for a remote NetWorker
server? [no] ↵
Will this system be running as a node within a
cluster? [no]
```

8. Decide if this host will run as part of a DG/UX cluster.

- ▶ If this is a standalone system and not part of a DG/UX cluster, accept the **no** default by pressing Enter. For example:

```
Will this system be running as a node within a
cluster? [no] ↵
```

- If this system will be a node in a DG/UX cluster, type **yes** and press Enter. For example:

```
Will this system be running as a node within a
cluster? [no] yes ↵
```

9. Carefully read the screen note about virtual disk requirements.

You now have the opportunity to create or adjust the size of the /var/opt/networker file system. This file system is needed to store the NetWorker online index and log files. The default size of 10000 blocks is enough space to store index information for multiple versions of several thousand files – about enough for a small workstation with a single disk drive. **THIS IS NOT ENOUGH SPACE FOR A SERVER WITH REMOTE CLIENTS!** If your system has more than one disk drive, or if it will be acting as a NetWorker server for remote clients, you probably need to allocate additional space for the online index.

The installation utility presents a table of default requirements for creating, sizing, and mounting the file system for online index and log files:

```
/var/opt/networker file system:
```

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
/var/opt/networker	var_opt_networker	-	Create	10000	sd(apsc(pci(1),f),0)

```
Modify this information? [no]
```

The physical disk names and block requirements may vary depending on your computer model.

10. Decide if you need to modify the default values presented in the table.

- To accept the default values presented in the table, press Enter. For example:

```
Modify this information? [no] ↵
```

- If you are setting up the **onc** package, go to **step 16**.
- If you are setting up **tcPIP** but *not* the **onc** package, go to **step 18**.

- To modify any of the information in the table, enter **yes**. For example:

```
Modify this information? [no] yes ↵
```

The installation utility presents a series of prompts similar to the following:

```
Mount a virtual disk at /var/opt/networker? [yes]
```

11. To accept the default mount point, press Enter as shown below; otherwise, enter an alternate mount point.

IMPORTANT Do not change the mount point if you might upgrade your operating system to a new release at some future date. The installation utility has no way of locating the correct virtual disk to upgrade if you change the mount point.

```
Mount a virtual disk at /var/opt/networker? [yes] ↵
Virtual disk to mount at /var/opt/networker:
[var_opt_networker]
```

12. Type the desired virtual disk name, or to accept the default name, press Enter.

```
Virtual disk to mount at /var/opt/networker:
[var_opt_networker] ↵
Size (in blocks) for var_opt_networker: [10000]
```

13. Type the desired block size, or to accept the default block size, press Enter.

```
Size (in blocks) for var_opt_networker: [10000] 50000 ↵
Physical disk for var_opt_networker:[sd(apsc(pci(1),f),0)]
```

Table 2-1 or
planning
worksheet 7

14. Type the alternative physical disk name, or to accept the default drive name, press Enter. For example:

```
Physical disk for var_opt_networker:[sd(apsc(pci(1),f),0)] ↵
```

IMPORTANT If you plan to install the DG/UX Cluster software product, you must specify a dual-initiator physical disk.

When you complete the desired changes for the virtual disk, the installation utility displays a table similar to the following that lists your modifications.

var/opt/networker file system:

File System	Virtual	Current	Action	Blocks	Physical
Mount Point	Disk	Blocks	Required	To Add	Disk
-----	-----	-----	-----	-----	-----
/var/opt/networker	var_opt_networker	-	Create	10000	sd(apsc(pci(1),f),0)

Modify this information? [no]

You may modify this information again, if desired.

15. To make further changes, type yes and return to step 10. To accept the values presented in the table, press Enter.

```
Modify this information? [no] ↵
```

The system displays the following messages while setting up the Data Backup Utility:

```
Creating /dev/dsk/var_opt_networker (10000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "var_opt_networker" created.
Virtual disk "var_opt_networker" made a volume.
Making file system on /dev/dsk/var_opt_networker
Mounting /dev/dsk/var_opt_networker.
```

- ▶ If you are setting up the **onc** package, go to **step 16**.
- ▶ If you are setting up **tcpip** but *not* the **onc** package, go to **step 18**.

Answering ONC questions

To set up ONC (Open Network Computing), you supply the host's NIS domain name that you recorded in Table 2-1 or **planning worksheet 7** in Appendix A.

- 16. Type the NIS domain name for your installation ("worknet" in this example) and press Enter.**

```
Enter the NIS Domain name: worknet ↵
```

- 17. Confirm the NIS domain name, or correct it by answering no and responding again.**

```
[worknet] Correct? [yes] ↵
```

A completion message appears when ONC is set up successfully.

Notes on ONC and NFS®

Initially, your computer runs as an NIS client. ONC and NFS may require further setup (such as changing your host from an NIS client to either an NIS master or NIS server). For more information on additional setup, refer to *Managing ONC™/NFS® and Its Facilities on the DG/UX® System*.

You can find a detailed account of the ONC and NFS root setup in **onc.root** and **nfs.root** log files located in the directory **/var/setup.d/log**.

Answering TCP/IP questions

When setting up TCP/IP, you enter the hostname and its Internet address you recorded in Table 2-1 or **planning worksheet 7** in Appendix A.

The exact text of your screen dialog depends on whether your computer has Ethernet LAN controllers.

IMPORTANT You set up a token ring or FDDI controller *after* DG/UX system installation is complete. For details, refer to the section on maintaining network interfaces in *Managing TCP/IP on the DG/UX® System*.

18. Enter the network configuration information that you recorded in Table 2-1 or planning worksheet 7 in Appendix A.

Refer to whichever of the following samples for this step is appropriate for your system's Ethernet LAN configuration. The Ethernet LAN device names may vary slightly depending on your platform and model. (The values **moe**, **128.222.2.1**, **0xffffffff00**, and the Ethernet controller device configurations in the sample dialogs are examples only.)

Single Ethernet LAN controller

The following queries refer to the primary network interface:

```
Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffffff00 ↵
[0xffffffff00] Correct? [yes] ↵
```

NOTE: Using "dpen(pci(0),C,0)" as the primary network interface controller.

Multiple Ethernet LAN controllers

The following queries refer to the primary network interface:

```
Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffffff00 ↵
[0xffffffff00] Correct? [yes] ↵
```

The following Ethernet controller devices are configured on this system

```
dpen(pci(0),C,0) cien0 cien1
```

```
Enter controller device name: [dpen(pci(0),C,0)] ↵
```

No Ethernet LAN controller

The following queries refer to the primary network interface:

```
Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
```

```
WARNING:  No Ethernet controllers are configured on
           this system.  A primary network interface
           will not be added at this time.  You can
           add TCP/IP network interfaces later
           through sysadm(1M).
```

Notes on TCP/IP

The files **tcpip.root** and **tcpip usr** located in the directory **/var/setup.d/log** contain a verbose description of the **tcpip** package setup process.

Additional TCP/IP setup may be required depending on your network and site configuration. Consult *Managing TCP/IP on the DG/UX[®] System* for information on the following additional TCP/IP features: routing, Domain Name System (DNS), server program and daemon management, SNMP, sendmail, and network databases.



For security installations, additional setup may be required to customize the way your security system works with the TCP/IP product. For information about Trusted IP networking, see *Managing Security on the DG/UX[®] System*.

- After you complete the setup questions, proceed to the next section to build and boot a kernel for your configuration.

Building and booting a configured kernel

You must build and boot a new kernel for the DG/UX product you installed. After setting up the packages, you are ready to build the DG/UX kernel for your new configuration.

The installer program builds a kernel using configuration data about devices, device drivers, streams modules, and socket protocols for the DG/UX system and software packages. It uses default values for general configuration variables. After you complete this installation, you may need to reconfigure your kernel, setting selected variables to different values. For information on tunable variables, refer to *Managing the DG/UX[®] System*.

Files in the directory **/usr/etc/master.d** list the configuration variables and default values for kernel builds. The kernel is located in the file **/dgux** on the **root** virtual disk.

Building a kernel

After package setup completes, the DG/UX installer program prompts you to build a custom kernel for your system.

- 19. To configure and build the kernel, press Enter at the initial prompt.**

```
Configure and Build kernel: [yes] ↵
System configuration identifier: [moe]
```

- 20. Assign a new name to your kernel configuration or accept the default name.**

```
System configuration identifier [moe] ↵
New [moe] system files? (yes):
```

The default (in brackets) is the hostname supplied during **tcpip** package setup. If you did not perform **tcpip** package setup, the generic filename, **aviion**, is the default. We recommend selecting a unique name for your system configuration.

21. Confirm the name by pressing Enter.

```
New [moe] system files? (yes): ↵
Operating system client? [no]
```

22. To signify that you are not installing an OS client, press Enter. Then, to proceed, press Enter again.

```
Operating system client? [no] ↵
Is this information correct? [yes]
```

Since your DG/UX system is preloaded on the host, the machine has its own disks for the operating system and is not an OS client. Therefore, you should accept the default **no** for this prompt.

23. Verify that the information is correct.

```
Is this information correct? [yes] ↵
```

Status messages appear while the installer utility configures the system and builds the kernel. This will take between 10 and 20 minutes, depending on your configuration.

If an error occurs during the kernel build, write down the error message and follow any screen instructions. Contact Data General if you are unable to resolve the problem.

Booting the kernel

After the kernel builds successfully, the installer program prompts you to boot the kernel you just built.

IMPORTANT The physical disk names you see may vary slightly depending on your computer model.

24. To boot the kernel, press Enter at the initial prompt.

```
Reboot now? [yes] ↵
Boot path: [sd(apsc(pci(1),f),0) root -f /dgux -i 3]
```

IMPORTANT If instead of rebooting, your system displays the `Boot command:` prompt, you must enter the **boot** command for your system. For example, to boot to init level 3, you might enter:

```
Boot command: sd(npvc(cpci(),3),0) root -f /dgux -i 3 ↵
```

You can use the command above, substituting the boot device name for your system in place of **npvc(cpci0,3)**. If you are not sure of the boot device name for your system, refer to your notice. For more information on using the **boot** command, refer to Appendix C.

25. To confirm the boot path and run level, press Enter.

Note that, as this example illustrates, you boot the new kernel to a run level of 3 (multi-user mode with network services).

```
Boot path: [sd(apsc(pci(1),f),0) root -f /dgux -i 3] ↵
```

```
All currently running processes will be killed.
Are you sure you want to reboot the system? [yes]
```

26. To reboot the system now, press Enter.

```
Are you sure you want to reboot the system? [yes] ↵
```

The screen clears and the new kernel boots, displaying startup and other informative messages similar to the following. The physical disk names will vary slightly depending on the type of media and the platform you are using. A typical example follows:

```
Booting sd(apsc(pci(1),f),0) root -f /dgux -i 3
DG/UX System Release Rn.nn Bootstrap
Loading image .....
DG/UX System Release Rn.nn, Version generic
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .....
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file
system.

Creating /dev ....
```

```
. <additional messages>
```

```
.
.
```

```
NOTE: The run level change is complete.
      See /etc/log/init.log for a verbose
      description of the system initialization
      process.
```

IMPORTANT If you receive an error message indicating that a package has not been set up, perform package setup using **sysadm** after you complete installation.

If the kernel encounters a device it cannot configure, it displays an error message and resumes configuring the remaining devices. Depending on the circumstances, you may choose either to investigate and correct the problem on the spot, or postpone investigation until your DG/UX system is operational. If, for example, a particular device requires repair, it might be prudent to complete your installation and work temporarily without that device.

When the DG/UX system has finished booting, the login prompt appears.

```
Press New Line to continue.  ↵  
moe  
DG/UX Operating System  
Console Login:
```

If you are using a graphics monitor, do not log in at the login prompt. Within a few seconds, a login screen will appear. Chapter 7 explains how to log in and complete your installation.

Where to go next

Go now to Chapter 7 to log in and finish your DG/UX installation.

End of Chapter

3

Performing a full installation from local release media

This chapter explains how to install DG/UX system software or DG/UX information security software on a computer configured with a new, newly formatted, or blank system disk.

Before proceeding, be sure to read all of the installation instructions in the notice that came with your product.

IMPORTANT To upgrade a DG/UX system (with or without installed maintenance updates), refer to Chapter 4.

The instructions in this chapter also apply if you are *reinstalling* the DG/UX system because an initial attempt at installation failed, or because a key operating system component was corrupted. This is referred to as a *clean installation*.

This chapter includes the following major sections:

- Summary of installation tasks
- Performing a clean installation
- Before you start
- Loading the DG/UX software
- Booting the installation utility
- Preparing physical disk drives
- Preparing required virtual disks
- Preparing a dump-to-disk area
- Loading the software packages
- Setting up software packages
- Building and booting a configured kernel
- Where to go next

Summary of installation tasks

For a full installation, you perform the steps shown in Figure 3-1.

IMPORTANT For dual-initiator disk configurations (in which two or more host computers share a single SCSI bus), make sure SCSI bus operating parameters are set properly *before* you begin the installation. For instructions, refer to the 014-series operating manual for your computer hardware model.

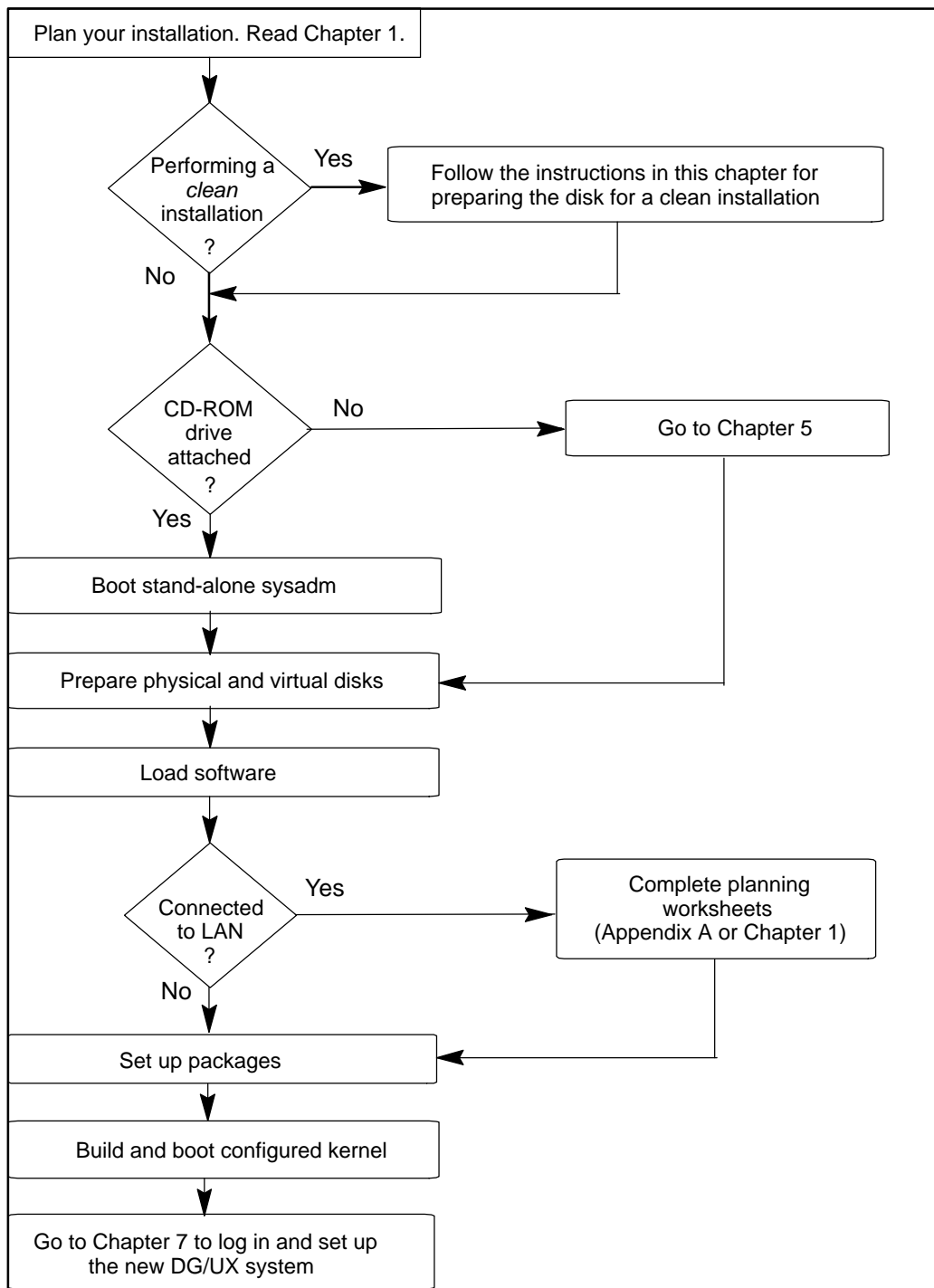


Figure 3–1 Full DG/UX system installation roadmap

Performing a clean installation

If you are installing the DG/UX system for the first time on a disk on which no other software is installed, you already have a clean disk and can skip to the next section to begin the installation process. You are performing a *full* installation and need not clean the system disk.

If you have an existing DG/UX system and are unable or do not want to *upgrade* as explained in Chapter 4, you can clean the system disk and then load the contents of the release medium on that clean system disk. This is called a *clean installation*.

If you want to clean the system disk so that you can perform a clean installation, follow the instructions for cleaning the system disk in the following section.

After you perform a clean installation, you will have to reinstall any software packages you want to use that are not included on the DG/UX release medium. For kernel packages not included on the DG/UX medium (Netware, OSI/P, PICK, SNA, X.25, and so on), you must refer to the notices for these products for how to keep or reset relevant parameters.

CAUTION *Performing a clean installation removes the virtual disks **root**, **usr**, **usr_opt_networker** (if running), **usr_opt_X11** (if running), and **usr_opt_sdk** (if running).*

Before you start

Please read this section carefully and verify that you are ready before beginning your installation.

Read your notice

Before performing installation, read your notice. It contains current, critical information for successfully installing the DG/UX system.

Do you have the information you need?

If you have not yet planned for this installation, read Chapter 1 and return to this chapter after you complete the **Planning Worksheets**.

Cleaning the system disk

You need to clean the system disk before installing the DG/UX software if any of the following conditions exist:

- You are reinstalling the DG/UX system because an initial attempt at installation failed, or a key operating system component was corrupted.

IMPORTANT If you are performing an upgrade and it fails, it is *not* necessary to do a clean installation (although you may). Just adhere to advice given by the system, and then restart the upgrade.

- You are installing information security software on a system that was not previously running with security software installed.
- Your system dies and you need to reinstall the operating system.

To prepare your disk for a clean installation, following these procedures before installing the DG/UX software:

- ▶ Ensure that you have a current backup of all your disks.
- ▶ Use the **shutdown** command to bring down your existing DG/UX system. For example, enter

```
shutdown -g0 -y ↵
```

IMPORTANT The **shutdown** command above brings down the system immediately (0-second grace period). If there are other users on your system, notify them several minutes prior to shutting down the system.

- ▶ Reboot standalone **sysadm**. For example, you might enter:

```
b sd(apsc(pci(1),f),0) usr -f /stand/sysadm ↵
```

- ▶ At the Sysadm Main Menu, make the following menu choices:

```
Virtual Disks -> Remove
```

- ▶ At the Virtual Disks: prompt, enter a question mark and press Enter:

```
Virtual Disks: ? ↵
```

- ▶ From the list displayed, choose **root**, **usr**, **usr_opt_networker** (if you are running Data Backup Utility or NetWorker), **usr_opt_sdk** (if you are running the Software Development Kit) and **usr_opt_X11** (if you are running X11). For example:

```
Virtual Disks: 1-5 ↵
```

- ▶ When the Virtual Disks Menu returns, you can either type a colon (:) to return to the Standalone Sysadm Main Menu, or you can press ^ to step back up through the menus until you reach the main menu.

Creating PC partitions

If you intend to install any other operating system such as MS-DOS on your hard disk, you should create PC partitions for this third-party software *before* installing the DG/UX software.

Refer to your third-party software documentation to install operating systems other than the DG/UX system. Be careful to use only the space you need and do not allow the third-party software to expand and take up the whole disk.

Preparing attached peripheral devices

Before you begin the installation procedure, power on all attached peripheral devices. The DG/UX installer program examines your system for standard devices to configure, but can detect them only if power is on.

CAUTION *If you have a WORM (Write-Once Read-Many) device in your configuration, power down the device to prevent the installation utility from preparing (writing to) that disk. A write operation to a WORM disk can inadvertently destroy its contents.*

For diskette, optical disk, or other devices that require a removable recording medium, be sure the drive contains media and is on line.

Changing your configuration

If you are changing any network parameters, virtual disk sizes, selection of packages, or have other configuration changes, complete the Planning Worksheets as described in Chapter 1 before proceeding. To use the DG/UX default configuration, you simply accept defaults at most installer program prompts.

If you do not use the default configuration and you set up the **/var** file system separately from the **/** (root) file system, you will not be able to boot to init 3. This is because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can avoid this problem by adding the following two lines to your **/etc/inittab** file to mount the independent **/var** file system:

```
mnt::sysinit:/sbin/fsck -pxl /var </dev/console >/dev/console 2>&1
var::sysinit:/sbin/mount /var </dev/console >/dev/console 2>&1
```

You must add these lines immediately after the line defining the default run level (that line starts with **def** and looks similar to this: **def:3:initdefault:**). You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

Installing a dual-initiator configuration

For dual-initiator disk configurations (in which two or more host computers share a single SCSI bus), make sure SCSI bus operating parameters are set properly *before* you begin the installation.

For instructions on setting your SCSI bus parameters, refer to the 014-series operating manual for your computer hardware model.

Be sure to check the SCSI bus parameters every time you install or upgrade the DG/UX software. Note that you must set the parameters *before* booting a DG/UX installer kernel or autoconfigured DG/UX custom kernel. If for some reason you cannot set the parameters first, you may have to shut down the remote host or disconnect the shared SCSI bus from the local host before booting such a kernel.

IMPORTANT Do not boot a DG/UX installer kernel or autoconfigured DG/UX custom kernel in an active dual-initiator configuration before setting the SCSI bus operating parameters. Unset or improperly set parameters will cause a serious DG/UX system error on the remote host.

Note that in a dual-initiator disk configuration, one SCSI bus cable connects two computer systems, either directly or (more commonly) daisy-chained through one or more SCSI disk devices such as a CLARiiON™ disk array. DG/UX Cluster configurations, for example, are common dual-initiator disk configurations.

Loading from a remote file system

If you are loading the DG/UX system software from a remote file system on a remote host, go to Chapter 5 for instructions before proceeding. Then return to the section on preparing physical disks later in this chapter.

Installing in an alternate release area

If you want to reduce system downtime lost to installation, or want to keep your running release intact, install the DG/UX system software in an alternate release area. For instructions on setting up and installing software in an alternate release area, see Chapter 6.

Sample installation dialogs

Appendix B contains a sample installation dialog for a typical system using a local CD-ROM device. You can refer to the dialog as a guide while you perform the DG/UX system installation. If you are familiar with installing a DG/UX system, you can follow the dialog rather than the step-by-step instructions in this chapter.

Loading the DG/UX software

Initially the boot procedure for the DG/UX system varies depending on your computer model. Follow the instructions in this section for the computer model you are using. For additional information on using the **boot** command, see Appendix C.

■ Worksheet 1

For the initial loading of the DG/UX software, you need to know if your computer model contains a System Control Monitor (SCM). If you are not sure, refer to your notice or your completed **Planning Worksheet 1** in Appendix A.

The following subsections contain instructions for:

- Loading the installation utility with an SCM.
- Loading the installation utility without an SCM.

Loading the installation utility on systems with an SCM

Follow the instructions in this subsection if you are installing the DG/UX system software on a system that is *not* preinstalled and *does* have an SCM.

■

IMPORTANT See your notice for a list of computer models that have an SCM.

If your system is powered off, you must turn it on and wait for the SCM prompt before you can begin the boot process. If you are already running the DG/UX software, you must initiate an orderly system shutdown using the **halt** or **shutdown** commands. The system then will reset and bring up the SCM prompt.

► Insert the DG/UX release medium in the CD-ROM drive.

■ Worksheet 2

► Boot the medium by typing the appropriate boot command at the SCM prompt, followed by Enter. Consult your notice or your completed **Planning Worksheet 2** in Appendix A for the name of your boot device. In the following example, **b** indicates the boot command, and **sd(npvc(cpci(),2),4)** is the name of the CD-ROM boot device.

```
SCM86> b sd(npvc(cpci(),2),4) ↵
```

Now proceed to the section on booting the installation utility. If you are loading remotely, go to the booting instructions in Chapter 5.

Loading the installation utility on systems without SCM

Follow the instructions in this subsection if you are installing the DG/UX system software on a system that is *not* preinstalled and does *not* have an SCM.

IMPORTANT See your notice for a list of computer models that do not have an SCM.

You will notice that your DG/UX system shipped with a boot floppy in addition to the DG/UX medium. This boot floppy contains the bootstrap software necessary to load the DG/UX software.

Before you begin the boot process, make sure your system is powered off.

- ▶ Insert the DG/UX release medium (CD-ROM) and the boot floppy (diskette) in their respective drives.
- ▶ Power on your system. The system will reset, boot the installation floppy, and display the following prompt:

Boot command:

- ▶ Enter the name of the CD-ROM boot device at the prompt. Enter *only* the name of the device. Consult your notice or your completed **Planning Worksheet 2** for the name of your boot device. For example:

Boot command: `sd(apsc(pci(1),f),5)` ↵

IMPORTANT Do NOT type: **b** *device_name*.

- ▶ You can remove the boot floppy from the diskette drive at any time now. The boot floppy provides the `Boot command:` prompt. You may choose to leave it in the drive until you are sure that you don't need to start over, but *you must remove the boot floppy from the drive before you reboot the configured kernel*.

Now proceed to the section on booting the installation utility. If you are loading remotely, go to the booting instructions in Chapter 5.

Booting the installation utility

The actual booting of the installation utility is basically the same for all platforms. (If you are loading from a remote system, go to the booting instructions in Chapter 5.)

The device and disk names will vary slightly depending on the computer model you are using. Refer to your notice for a listing of typical device names.

The installation utility creates virtual disks on the physical disks it prepares, makes file systems, and loads files from the release medium onto these file systems. It also sets up the system software and builds and boots a custom kernel, configured with all attached standard devices.

You have already entered the necessary command to load the installation utility. While it starts, you will see the initial bootstrap messages similar to the following example.

```
Booting sd(apsc(pci(1),f),5)
DG/UX System Release Rn.nn Bootstrap
Loading image .....
DG/UX System Release Rn.nn, Version Standalone sysadm
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .....
```

The installation utility automatically configures all standard devices attached to your system. A standard device is one that is recognized by the installation utility and the DG/UX system. Periods (.) written to the screen indicate that the utility is configuring your system's devices. The number of devices attached to your system determines the duration of the configuration process.

IMPORTANT A significant delay in the writing of periods to the screen means that the installation utility cannot locate all of the devices that are specified in the utility's built-in list of standard devices. Because your system is unlikely to include all standard devices, this delay is normal.

The initialization process continues as follows:

```
Registering disks ..
Running with no swap area.
Using memory-resident root file system
Creating /dev ....
```

```
INIT: SINGLE USER MODE
```

Periods (.) written to the screen at regular intervals indicate that the installation utility is loading.

After the installation utility has finished loading, you see the standalone **sysadm** main menu.

Standalone Sysadm Main Menu

```

1 Physical Disk    ->  Manage physical disks
2 Virtual Disk    ->  Manage virtual disks
3 File System     ->  Manage file systems
4 Install Software ->  Install system software

```

Enter a number, a name, ? or <number>? for help, <NL> to take the default, or q to quit: [Install Software]:

Beginning the installation process

Now you are ready to begin the interactive process of installing the DG/UX software. Follow the steps outlined in the remainder of this chapter starting from the Standalone Sysadm Main Menu (shown below).

Standalone Sysadm Main Menu

```

1 Physical Disk    ->  Manage physical disks
2 Virtual Disk    ->  Manage virtual disks
3 File System     ->  Manage file systems
4 Install Software ->  Install system software

```

Enter a number, a name, ? or <number>? for help, <NL> to take the default, or q to quit: [Install Software]:

1. Press Enter to display the Install System Software menu. For example:

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to the previous menu, or q to quit: [Install Software]: ↵

Install System Software Menu

```

1 Prepare physical disks
2 Prepare virtual disks
3 Load software
4 Set up software
5 Configure and build kernel
6 Reboot kernel
7 All steps

```

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to the previous menu, or q to quit: [All steps]:

2. Press Enter to begin installation. For example:

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to the previous menu, or q to quit: [All steps]: ↵

Now the installation begins and you are prompted for information concerning the preparation of the physical disks.

Preparing physical disk drives

```
1. Prepare physical disks
Run this step now? [yes]
```

This phase of the installation process ensures that all writable physical disks have labels, contain the virtual disk information table, are registered, have an up-to-date bootstrap installed, and have bad block remapping established. A non-volatile RAM (NvRAM) database is also created during this phase.

If you have any other disks in addition to the system disk, you can format them and create the necessary virtual disks and file systems later after you complete this installation. For more information, refer to *Managing Mass Storage Devices and DG/UX® File Systems*.

3. Press Enter to begin preparing the physical disks. For example:

```
1. Prepare physical disks

Run this step now? [yes] ↵
Physical disk(s) to prepare: [all]
```

4. Select physical disks to prepare.

To prepare all your configured disks, press Enter and proceed with **step 5**. For example:

```
Physical disk(s) to prepare: [all] ↵
```

To display a list of configured physical devices, enter a question mark (?). For example:

```
Physical disk(s) to prepare: [all] ? ↵
```

Enter the name of each device as prompted.

IMPORTANT To expedite the installation process, prepare only the system disk (the physical disk that contains the **root**, **swap**, and **usr** virtual disks) now, and prepare the remaining physical disks after the system is installed.

Informational messages appear as the system prepares each physical disk. You'll see messages similar to the following when all disks have been prepared.

```
Bootstrap installed in existing partition on
sd(apsc(pci(1),f),0)
Physical disk sd(apsc(pci(1),f),0) prepared.
```

You will also see messages similar to the following:

```
NvRAM database installed in existing partition on
sd(apsc(pci(1),f),0)
Physical disk prepared.
```

Now you are ready to prepare the required virtual disks.

Preparing required virtual disks

```
2. Prepare required virtual disks
Run this step now? [yes]
```

In this part of the installation you create the virtual disks for **swap**, **root**, and **usr**. Other packages require virtual disks too, but you create them later.

IMPORTANT Screen displays in this section represent sample installations; your screen display reflects your system configuration.

5. Press Enter to begin. For example:

```
Run this step now? [yes] ↵
Register all standard physical disks? [yes]
```

A *standard physical disk* is one that the installation utility recognizes. The file `/usr/etc/probedevtab` lists the standard device names. If you have nonstandard devices, you may configure them following installation, as described in *Managing Mass Storage Devices and DG/UX[®] File Systems*.

Registering physical disks enables the operating system to recognize virtual disks. A physical disk must have been prepared before it can be registered (see the section on preparing physical disk drives). A disk drive that does not contain a virtual disk information table cannot be registered.

6. Register all standard physical disks by pressing Enter. For example:

```
Register all standard physical disks? [yes] ↵
```

The time required to register all disk drives depends on the size of your hardware configuration.

After physical disks are registered, the installation utility presents a table and prompt. This table shows the requirements for creating, sizing, and mounting the required virtual disks.

IMPORTANT The physical disk names and the minimum required block sizes vary slightly depending on the size of system you are using.

The following is a typical table example:

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
-none-	swap	-	Create	150000	sd(apsc(pci(1),f),0)
/	root	-	Create	70000	sd(apsc(pci(1),f),0)
/usr	usr	-	Create	280000	sd(apsc(pci(1),f),0)

Modify this information? [no] ↵

7. Accept or change the values presented in the table.

To accept the default values, press Enter as shown below; after the verification messages, skip to the section on preparing a dump-to-disk area and **step 12**.

Modify this information? [no] ↵

Creating /dev/dsk/swap...

... (verification messages similar to those shown in **step 11**.)

IMPORTANT *Do not reduce the size of any virtual disk.*

If you choose to modify any of the information in the table, type **yes**. For example:

Modify this information? [no] **yes** ↵

If you plan to install the DG/UX Cluster Software product, you generally need to modify the default configuration. By default, the DG/UX installation utility creates the **swap**, **root**, and **usr** virtual disks on your computer's private internal physical disk. However, the DG/UX Cluster option requires that **root** and **usr** reside on a dual-initiator physical disk to make them accessible to all computers in the cluster. Refer to DG/UX Cluster documentation for more information.

The next section provides a general procedure for modifying the default configuration.

Modifying the default virtual disk configuration

This section outlines a general procedure for modifying default configurations for the required virtual disks.

The installation utility presents you with a series of queries about each file system mount point. Consult **Planning Worksheet 5** in Appendix A for the information necessary to customize your configuration.

IMPORTANT If you have no compelling need to change the default virtual disk names, you are advised against doing so. If you do change the name of a virtual disk, record the name. You must supply new virtual disk names during future upgrades to your DG/UX system.

You may increase the sizes of virtual disks, but do not reduce their default sizes. You see the following prompt:

```
Virtual disk to use for swapping: [swap]
```

IMPORTANT The **swap** space virtual disk is not mounted at a location since it contains no file system. For **swap**, you are asked for the virtual disk to be used for swapping. For **root** and **usr**, you are asked for the mount point.

In the following steps, we modify the virtual disk **swap**.

8. Type the desired virtual disk name, or press Enter to accept the default name. For example:

```
Worksheet 5      Virtual disk to use for swapping: [swap] ↵
                  Size (in blocks) for swap: [100000]
```

9. Type the desired block size, or to accept the default block size, press Enter. For example:

```
Worksheet 5      Size (in blocks) for swap: [100000] 200000 ↵
                  Physical disk for swap: [sd(apsc(pci(1),f),0)]
```

10. Type the alternate physical disk name, or press Enter to accept the default drive name. For example:

```
Worksheet 5      Physical disk for swap: [sd(apsc(pci(1),f),0)] ↵
```

After you complete the information for **swap**, you will be asked to provide similar information for the other virtual disks. Thus, you repeat **steps 8** through **10** for **root** and **usr**.

IMPORTANT If you plan to install the DG/UX Cluster Software product, specify a dual-initiator physical disk for the **root** and **usr** virtual disks. You can specify any physical disk for the **swap** virtual disk, but DG/UX cluster administration will be easier if you specify a dual-initiator disk for **swap**.

After you complete the desired changes for each of the virtual disks, the installation utility presents a table listing your modifications. For example:

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
-none-	swap	-	Create	200000	sd(apsc(pci(1),f),0)
/	root	-	Create	60000	sd(apsc(pci(1),f),0)
/usr	usr	-	Create	280000	sd(apsc(pci(1),f),0)

Modify this information? [no]

You may modify this information again, if desired.

- 11. To continue modifying, continue to repeat steps 7 through 10. To accept the values presented in the table, press Enter. For example**

Modify this information? [no] ↵

The following messages confirm your modified values. Remember that the physical disk names will vary slightly depending on the type of media and the platform you are using.

```

Creating /dev/dsk/swap (200000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "swap" created.
Virtual disk "swap" made a volume.
Beginning swapping on /dev/dsk/swap.
Creating /dev/dsk/root (60000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "root" created.
Virtual disk "root" made a volume.
Making file system on /dev/dsk/root
Mounting /dev/dsk/root.
Creating /dev/dsk/usr (280000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "usr" created.
Virtual disk "usr" made a volume.
Making file system on /dev/dsk/usr
Mounting /dev/dsk/usr.

```

Preparing a dump-to-disk area

You should set up a default dump destination so your system knows where to direct a memory dump under a halt condition. Typically, if the system goes down (halts), it is necessary to take a system dump (copy memory to a designated device) to send to the Customer Support Center for analysis.

If you create the optional dump-to-disk area, you can configure your system to automatically take a memory dump and reboot the system in the event of a system halt.

If you do not define a default dump destination, your system will not be able to create a dump. The lack of a system dump can be a serious obstacle to finding and fixing system problems.

The next few prompts involve the option to create a virtual disk for a specific dump-to-disk area. This dump-to-disk area may be created on any available SCSI system disk, and will be called **dump**. The installer utility uses an algorithm based on your memory configuration to determine how much space to allocate to the dump-to-disk area as a default value.

IMPORTANT The DG/UX operating system does not support dumping over the network.

12. Decide which of the following scenarios applies to your system and proceed as instructed.

- If a **dump** virtual disk does *not* exist and you do not have enough contiguous free space to create the recommended dump-to-disk area, you will see the following message:

```
Warning: There are no registered physical disks with
adequate contiguous free space to allocate
the recommended nnn block area for
halt dumps. If you wish to allocate an area
for halt dumps, you must abort the
installation, correctly attach one or more
physical disks to your system, and try again.
```

If you see this warning and do *not* want to create a virtual disk for halt dumps, skip the rest of this section and proceed to the section on loading the DG/UX software, **step 19**.

If you see this warning and *do* want to create a virtual disk for halt dumps, you can either defer the setup of the dump virtual disk until after you complete the installation, or you can abort the installation and add one or more physical disks (or otherwise free up sufficient contiguous space) before trying again. You can run the dump disk procedure any time after installation by running the command **/usr/sadm/sysadm/bin/prepdump**.

IMPORTANT To abort your installation, use the ^ key to return to the beginning of an operation; then type **q** (quit) and press Enter.

- If a **dump** virtual disk does *not* exist and you do not see any warning, the system will display a screen similar to the following example. Note that the physical disk names will vary slightly depending on the type of media and the platform you are using.

No existing 'halt dump' disk found. Current free disk pieces (contiguous free space regions specified in blocks):

Physical Disk	Free Pieces
sd(apsc(pci(1),f),0)	130116
sd(apsc(pci(1),f),0)	5000

Create a virtual disk for halt dumps? [yes]

Consider the following to help you decide whether to create a virtual disk for halt dumps. Then proceed to **step 13**.

- If a dump virtual disk already exists but is *not* called **dump**, the system will not automatically recognize it, and may prompt you to create another virtual disk called **dump**. See the **dg_sysctl(1M)** man page for how to specify the alternate disk name.
- If a dump virtual disk already exists, is called **dump**, and is equal to or larger than the recommended size, you will not receive any message. The system will proceed with the loading of the DG/UX software as described in **step 19**.
- If a dump virtual disk already exists, is called **dump**, and is smaller than the recommended size, but no more free space is available, you will not receive any message. The system will proceed with the loading of the DG/UX software as described in **step 19**.
- If a dump virtual disk already exists, is called **dump**, is smaller than the recommended size, and free space *is* available, you are asked if you want to replace the existing dump disk with a larger partition. For example:

The existing dump partition is 1000 blocks. The recommended dump partition size (based on the current memory configuration) is 57000.

Replace existing dump disk with a larger partition? [yes]

If you do not want to increase the size of your dump disk, answer **no**, press Enter, and proceed to **step 19**.

If you do want to increase the size of your dump disk, answer **yes** by pressing Enter. For example:

```
Replace existing dump disk with a larger
partition? [yes] ↵
```

```
Virtual dump disk removed.
```

Now go to **step 14**.

13. Answer if you want to create a virtual disk for halt dumps.

Although creating the **dump** virtual disk is optional, we recommend that you create one.

- If you do *not* want to allocate space for a dump-to-disk area, type **no** and press Enter. For example:

```
Create a virtual disk for halt dumps? [yes] no ↵
```

Now skip the rest of this section and proceed to the section on loading the DG/UX software, **step 19**.

- If you *do* want to allocate space for a dump-to-disk area, press Enter to answer **yes**. For example:

```
Create a virtual disk for halt dumps? [yes] ↵
```

Continue with **step 14**.

14. The system will display the recommended default space to create the dump virtual disk. Accept or change the values presented in the table.

You will see a table similar to the following:

Recommended Virtual Disks:

File System	Virtual	Current	Action	Blocks	Physical
Mount Point	Disk	Blocks	Required	To Add	Disk
-----	-----	-----	-----	-----	-----
-none-	dump	-	Create	57000	sd(apsc(pci(1),f),0)

Modify this information? [no]

- To accept the default values, press Enter as shown below; then go to **step 19**.

```
Modify this information? [no] ↵
```

- If you choose to modify any of the information in the table, type **yes** and press Enter. For example:

```
Modify this information? [no] yes ↵
```

The next section provides a general procedure for modifying the default configuration.

Modifying the default dump virtual disk

This section outlines a general procedure for modifying the default configuration for the optional **dump** virtual disk.

The installation utility presents you with a series of queries about the **dump** virtual disk.

You may increase or decrease the size of the **dump** virtual disk. After you answer that you want to modify the default size, you see the following prompt:

Virtual disk to use for dumping: [dump]

IMPORTANT The **dump** virtual disk is not mounted at a location since it contains no file system. You are asked for the virtual disk to be used for halt dumps.

In the following examples, we modify the virtual disk **dump**, using the example of available disk space displayed at the beginning of this section in the free disk pieces table.

15. Type the desired virtual disk name, or press Enter to accept the default name. For example:

Worksheet 5

Virtual disk to use for dumping: [dump] ↵
Size (in blocks) for dump: [57000]

IMPORTANT If you have no compelling need to change the default virtual disk name, you are advised against doing so. If you do change the name of a virtual disk, record the name. You must supply new virtual disk names during an upgrade to your operating system.

16. Type the desired block size, or to accept the default block size, press Enter. For example:

Worksheet 5

Size (in blocks) for dump: [57000] 60000 ↵
Physical disk for dumping: [sd(apsc(pci(1),f),0)]

17. Type the alternate physical disk name, or to accept the default drive name, press Enter. For example:

Worksheet 5

Physical disk for dumping: [sd(apsc(pci(1),f),0)] ↵

IMPORTANT The physical disk you use for halt dumps *must* be a SCSI physical disk. If you plan to install the DG/UX Cluster Software product, note that you can specify either an internal physical disk or a dual-initiator physical disk. We recommend a dual-initiator physical disk for the dump-to-disk area because it allows a halt dump to be copied or analyzed even when the machine that produced the dump is down.

After you complete the desired changes for the virtual disk, the installation utility presents a table similar to the following that lists your modifications:

Physical disk for dump: [sd(apsc(pci(1),f),0)] ↵

Recommended Virtual Disks:

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
-none-	dump	-	Create	60000	sd(apsc(pci(1),f),0)

Modify this information? [no]

You may modify this information again, if desired.

- 18. To continue modifying, type yes and repeat steps 15 through 17. To accept the values presented in the table, press Enter. For example:**

Modify this information? [no] ↵

The following messages confirm your modified values.

```
Creating /dev/dsk/dump (60000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "dump" created.
Virtual disk "dump" made a volume.
Making vdm_dump(sd(apsc(pci(1),f),0),dump) the default dump
device.
```

Now that you have prepared the required **swap**, **root**, **usr**, and the optional **dump** virtual disks, you are ready to load the DG/UX software packages.

Loading the software packages

In this section you select and load software packages. Your screen displays the following prompt:

```
3. Load software
Run this step now? [yes]
```

If you are installing from a remote file system, go to Chapter 5 for instructions. Then return to the section in this chapter on selecting the packages to load and proceed with **step 22**.

- 19. To load the system software, press Enter. For example:**

```
Run this step now? [yes] ↵
Type of release medium: [CD-ROM]
```

20. Specify the device that contains the release media:

Type of release medium: [CD-ROM] ↵

Press Enter to accept the CD-ROM default.

21. Select the release you want to load. For example:

Release name: [DG/UX R4.20MU04 update only] ↵

Enter a question mark to list the release options.

See your notice for a list of the releases you can load from the release medium.

After you specify the release medium and the release to load, you may hear a whirring sound, which indicates that the drive is seeking and reading the CD-ROM. You see a message similar to the following:

DG/UX Operating System with X Window System Rn.nn from
Data General Corporation

Go to the next section to select packages to load and proceed with **step 22**.

Selecting the packages to load

Your screen displays the following prompt:

Package Name(s): [development]

22. Specify the software packages and suites you want to load.

IMPORTANT See your notice for a complete list of available packages and suites, and for information on the packages you must load to run your system. Some package selections require the installation of other packages; see your notice for information on dependencies among packages.

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- To load the recommended DG/UX software packages, press Enter to accept the default suite as shown in the example below; then go to **step 24**.

Package Name(s): [development] ↵

Only press Enter if you are sure you want to accept the default suite's software packages, and no other suites or packages. If you do not want to load only the default suite, or if you are not sure, see your notice for descriptions of available packages and suites.

IMPORTANT If you did not create all the recommended virtual disks, do not accept the default. If you accidentally do so, the space required for the packages will exceed the space you reserved for them.

- To list the available suites and packages for your system, type a question mark (?). For example:

```
Package Name(s): [development] ? ↵
```

```
[...available packages and suites are listed here...]
```

- To specify the desired packages, enter one or more package suites and individual packages by name or number, separated by commas or spaces. You may also use a dash to specify a range of package numbers.

After you enter the suites and packages you want to load, the system will list the selected packages and ask for verification, as in the following example:

```
Package Name(s): [development] 1,4 ↵
```

```
You selected the following packages:
```

```
[...selected packages display here...]
```

- 23. Press Enter to load the suites and packages selected as shown below. To change the selection, answer no and repeat step 22.**

```
Correct? [yes] ↵
```

```
List file names while loading? [no]
```

- 24. To forgo the listing of filenames during loading, press Enter as shown below. To see the names of files as they load, type yes followed by Enter.**

```
List file names while loading? [no] ↵
```

IMPORTANT We recommend that you not list the names of the files as they load because doing so can obscure any error messages that might occur during the loading phase of installation.

Pre-answering kernel build questions

- 25. Decide whether or not to answer the kernel build questions now before the packages are loaded. (To expedite the installation process, take the default.)**

- If you accept the **yes** default response by pressing Enter, the installer utility prompts you for information needed later for the kernel build. This enables you to leave more of the installation process unattended, if you choose. For example:

```
Answer kernel build questions before loading? [yes] ↵
System configuration identifier [aviion]
```

- If you prefer to wait and answer the kernel build questions later during the kernel build process, enter **no** after the prompt. Then skip to **step 29**.

```
Answer kernel build questions before loading?[yes] no↵
Checking for recommended file system mount points.....
```

26. Verify your system configuration filename by pressing Enter, or type the correct name and press Enter. For example:

```
System configuration identifier [aviion] moe ↵
New [moe] system files? [yes] ↵
Operating system client? [no]
```

27. Indicate whether you are building a kernel for this host or for an operating system client.

```
Operating system client? [no] ↵
```

Since you are upgrading the DG/UX system on the host, the host must have its own disks for the operating system. Therefore, you should accept the default for this prompt.

28. Decide whether or not to reboot automatically after building the kernel.

- If you prefer to pause between kernel building and booting (for example, to verify a successful kernel build or the boot path), answer **no** after the prompt and press Enter. For example:

```
Automatically reboot after building kernel? [yes] no ↵
Checking for recommended file system mount points....
```

- To expedite installation, accepting the default **yes** response causes the kernel to boot automatically after it is built. For example:

```
Automatically reboot after building kernel? [yes] ↵
Checking for recommended file system mount points....
```

IMPORTANT If your system required a boot floppy to install DG/UX, you must remove the boot floppy from the diskette drive before the system tries to reboot.

Preparing virtual disks for optional packages

29. Prepare to create virtual disks for optional packages.

- ▶ If you are not installing the **networker**, **sdk**, or **X11** packages, go to the section on preparing to load packages, and proceed with **step 37**.
- ▶ If you are loading **networker**, **sdk**, or **X11**, continue with **step 30**.

30. Wait while the installation utility verifies the file system requirements of optional packages you selected (networker, sdk, or X11). After a few moments you see the following message:

Checking for recommended file system mount points

Note that periods written to the screen indicate that the process is ongoing. A pause between the display of periods is normal.

After a few minutes, the installation utility presents a table similar to the following, showing the requirements for creating, sizing, and mounting the virtual disks:

Recommended File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
/usr/opt/X11	usr_opt_X11	-	Create	90000	sd(apsc(pci(1),f),0)
/usr/opt/networker	usr_opt_networker	-	Create	40000	sd(apsc(pci(1),f),0)
/usr/opt/sdk	usr_opt_sdk	-	Create	60000	sd(apsc(pci(1),f),0)

Modify this information? [no]

31. To accept the default values presented in the table, press Enter as shown below and go to the section on preparing to load packages, step 37.

Modify this information? [no] ↵

IMPORTANT If you plan to install the DG/UX Cluster Software product, you will generally need to modify the default configuration. By default, the DG/UX installation utility creates the virtual disks on your computer's internal physical disk. However, the DG/UX Cluster option requires that the **usr_opt_X11**, **usr_opt_networker**, and **usr_opt_sdk** virtual disks reside on a dual-initiator physical disk so they are accessible to all computers in the cluster.

To modify any of the information in the table, enter **yes** as shown below and continue with the section that follows.

```
Modify this information? [no] yes ↵
```

Modifying the default virtual disks for optional software packages

This section outlines a general procedure for modifying the default values for the software packages on the **usr_opt_networker**, **usr_opt_sdk**, and **usr_opt_X11** virtual disks.

Consult your completed **Planning Worksheet 5** in Appendix A for the information necessary to customize your configuration.

The installation utility asks about each file system's configuration. The **usr_opt_X11** virtual disk is used in the following example. Therefore, you see a prompt similar to the following:

```
Mount a virtual disk at /usr/opt/X11? [yes]
```

32. To accept the default mount point, press Enter. For example:

```
Worksheet 5      Mount a virtual disk at /usr/opt/X11? [yes] ↵
                  Virtual disk to mount at /usr/opt/X11:[usr_opt_X11]
```

IMPORTANT Answering **no** to this prompt does not give you the option to select an alternate mount point. It causes the **X11** files to be loaded into **/usr**. This could create a space problem and make the **X11** package unusable. You are strongly urged to accept the default mount point.

33. Type the desired virtual disk name, or accept the default name by pressing Enter. For example:

```
Worksheet 5      Worksheet 5 Virtual disk to mount at
                  /usr/opt/X11:[usr_opt_X11] ↵
                  Size (in blocks) for usr_opt_X11: [90000]
```

34. Type the desired block size, or press Enter to accept the default block size.

IMPORTANT *Do not reduce* the size of virtual disks. (The only exception is if you are not installing the SDK packages: Without SDK, you can reduce the size of **usr_opt_X11** by 10,000 blocks.)

```
Worksheet 5      Size (in blocks) for usr_opt_X11: [90000] 100000 ↵
                  Physical disk for usr_opt_X11: [sd(apsc(pci(1),f),0)]
```


35. Type the alternate physical disk name, or to accept the default drive name, press Enter. For example:

```
Physical disk for usr_opt_X11: [sd(apsc(pci(1),f),0)] ↵
```

IMPORTANT If you plan to install the DG/UX Cluster Software product, you must specify a dual-initiator physical disk for the **usr_opt_X11**, **usr_opt_networker**, and **usr_opt_sdk** virtual disks.

After you make the desired changes for each of the virtual disks, the installation utility presents a table similar to the following that lists your modifications:

Recommended File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
/usr/opt/X11	usr_opt_X11	-	Create	100000	sd(apsc(pci(1),f),0)
/usr/opt/networker	usr_opt_networker	-	Create	40000	sd(apsc(pci(1),f),0)
/usr/opt/sdk	usr_opt_sdk	-	Create	60000	sd(apsc(pci(1),f),0)

Modify this information? [no]

36. To accept the values presented in the table, press Enter. If you want to modify the information again, type yes, press Enter, and modify the information as prompted. When you are satisfied with the values presented in the table, press Enter as shown below.

```
Modify this information? [no] ↵
```

Now the installation utility prepares to load the software packages.

Preparing to load packages

You will see messages similar to the following as the installation utility creates and mounts the virtual disks for **networker**, **sdk**, and **X11**.

```
Creating /dev/dsk/usr_opt_X11 (100000 blocks) on sd(apsc(pci(1),f),0).
Virtual disk "usr_opt_X11" created.
Virtual disk "usr_opt_X11" made a volume.
Making file system on /dev/dsk/usr_opt_X11
Mounting /dev/dsk/usr_opt_X11.
Creating /dev/dsk/usr_opt_networker (40000 blocks) on sd(apsc(pci(1),f),0).
Virtual disk "usr_opt_networker" created.
Virtual disk "usr_opt_networker" made a volume.
Making file system on /dev/dsk/usr_opt_networker
Mounting /dev/dsk/usr_opt_networker.
Creating /dev/dsk/usr_opt_sdk (60000 blocks) on sd(apsc(pci(1),f),0).
```

```
Virtual disk "usr_opt_sdk" created.
Virtual disk "usr_opt_sdk" made a volume.
Making file system on /dev/dsk/usr_opt_sdk.
Mounting /dev/dsk/usr_opt_sdk.
```

NOTE: You may specify additional file systems which should be mounted during the installation.

Mount other file system(s)? [no] ↵



If you are overloading (upgrading) a previously installed DG/UX security product for which you created a separate file system to contain the A&A database, mount this file system now. If you do not mount the separate file system containing the A&A database, the setup process will recreate an entire default A&A database with model users and administrative role accounts in the **root** file system, and you will be prompted to enter initial passwords for these accounts again.

Before package loading and setup begins, the installation utility checks the sizes of the mounted file systems.

37. Wait while the installation utility verifies that there is sufficient file system space to contain the packages you selected. You see messages similar to the following:

```
Validating capacity of the mounted file systems.....
.....
.....
```

Validation takes a few minutes.

If there is not enough space on your system disk, the system notifies you with a message like the following:

```
Warning:  There is not enough space in /mnt/root to
          load nnnnn blocks, as only nnnnn blocks are
          available.
```

To make space available now, you can clean up the system before loading packages. The cleanup scripts will list pathnames and files that you may want to remove.

NOTE: No file will be removed without your explicit confirmation.

Clean up the system before loading packages? [yes]

CAUTION *If you see such a message, refer to Appendix D, “Fixing installation problems,” before proceeding. You can select different packages, resize virtual disks, escape to the shell to do manual file cleanup, or run the assisted cleanup program by answering **yes** to the clean-up prompt.*

Assuming that your system disk has enough space, you see the following note:

NOTE: The installation utility will now start the package loading phase of the installation procedure. Once this phase begins, you cannot interrupt it.

Continue with the installation? [yes]

38. Press Enter to begin installing the selected packages. For example:

Continue with the installation? [yes] ↵

The installation utility displays another message while it locates the relevant package setup queries to present to you.

NOTE: If the packages you have selected require setup (e.g. onc, tcpip, networker, etc.) then please wait until the next prompt appears. The delay may take up to 5 minutes depending on the number of packages you have chosen to load.

Loading DG/UX Operating System with X Window System Rn.nn of <Month/Year> from Data General Corporation.

39. Decide whether or not to answer package setup questions in advance of package loading.

IMPORTANT Be sure to read *all* the information about this step *very carefully* before making a decision.

The installation utility displays the following note and prompt:

NOTE: To expedite the package loading and setup steps, you can answer package setup questions in advance of package loading by pressing Enter at the prompt. If, instead, you prefer to continue the package loading and setup steps interactively and at your own pace, type “no” before you press Enter.

Do you want to answer, in advance, package setup questions before package loading is complete? [yes]

Yes, expedite installation

Answering **yes** to the question expedites the remaining installation steps. After you supply configuration information that you recorded in **Planning Worksheet 7** in Appendix A, the remaining installation steps are not interactive. However, if you are installing the DG/UX system with information security, you may be prompted later (during setting up software packages) to assign security account passwords.

If you expedite installation, you can leave your computer for up to one hour after answering questions about package setup; the installation utility completes the installation unattended. If you choose to answer the kernel build questions before the packages are loaded and to automatically boot the kernel, the entire process will complete without interaction (except for security installers, who will be prompted for passwords).

- If you wish to expedite installation, answer **yes** to this prompt and go to **step 45**.

No, do not expedite installation

Answering **no** selects interactive installation, which you may prefer to do if you want to monitor the installation procedure. Interactive installation presents prompts and messages that allow you to build and boot the kernel at your own pace.

- If you wish to continue the installation interactively, answer **no** to the prompt and proceed with the next section on loading onto virtual disks.

**Loading onto virtual disks**

The installation utility presents the following message:

```
Preparing to load the packages .....
```

The load preparation runs scripts that remove obsolete files and libraries, freeing up physical disk space to accommodate the software load. This process can take up to 20 minutes.

40. Take a break if you'd like. Packages can load for up to one hour.

Periods (.) are written to the screen at regular intervals to indicate that the packages are being loaded.

IMPORTANT If you have a problem that prevents a successful software load, refer to Appendix D for more information.

The following sample output is similar to what you see after loading the default **development** suite of software packages:

```

Loading package dgux .....
Package dgux has been loaded.

Loading package networker .....
Package networker has been loaded.

.
.
.

```

Now the installation utility is ready to set up the software packages.

Setting up software packages

For most packages, the setup process is not interactive. However, if you selected the **networker**, **onc**, or **tcpip** packages, or if you are installing a DG/UX security product, you must provide information when prompted.



IMPORTANT If you overloaded an existing security installation, you may see only a subset of these questions, or a prompt asking if you want to retain existing settings for these packages.

A detailed account of each package's setup is logged in a file that is named in the general form `/var/setup.d/log/package.root` or `/var/setup.d/log/package.usr`.

Once package loading completes, you see the following message:

```

Package load is finished.
The selected packages have been loaded.

4. Set up software
Run this step now? [yes]

```

41. To set up packages, press Enter. For example:

```
Run this step now? [yes] ↵
```

The system pauses while the installation utility checks for packages that need to be set up, and then returns the following prompt.

```
Package Name(s): [all]
```

42. Decide whether to set up all packages or to specify them individually.

► To set up all the packages that were loaded, press Enter and go to the next step. For example:

```
Package Name(s): [all] ↵
OK to perform operation? [yes]
```

► **To set up packages individually, list them by entering a question mark (?). For example:**

```
Package Name(s): [all] ? ↵
```

A screen similar to the following appears.

```
Select the package(s) you want to set up. If you want
to set up all packages select 'all,' do not select any
individual package names.
```

```
Choices are
```

```
[...available packages display here...]
```

```
Enter a number, a range of numbers (n-m, where m can
be '$' to indicate the last item), a name, the initial
part of a name, <NL> to take the default, ? for help,
^ to return to the previous query, < to restart the
operation, or q to quit.
```

```
Package Name(s): [all]
```

Next, specify the individual packages you want to set up, using the full names or corresponding numbers of the packages in the list. Separate each name or number by commas or spaces. You also may use a dash to specify a range of package numbers. For example:

```
Package Name(s): [all] 2, 4-7, 9 ↵
OK to perform operation? [yes]
```

43. To start the setup scripts for selected packages, press Enter. If you want to modify your selection, answer no and repeat the process. When you are satisfied with your selections, press Enter as shown below:

```
OK to perform operation? [yes] ↵
```

Status messages are displayed during setup; a message appears when setup has been completed successfully. Packages are set up in alphabetical order.

IMPORTANT Read system-generated messages during package setup, especially those labeled NOTE and WARNING.

If the setup of a particular package fails, the utility informs you with a warning message. Write down the message, and refer to Appendix D for troubleshooting help.



44. If you are installing a DG/UX security product, assign passwords to default security accounts.

Security installers who have not already set up security accounts will assign passwords for security accounts now. Refer to your security notice for instructions on assigning passwords, then return here to continue the installation.

45. Determine how to proceed by carefully reviewing the following options:

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- ▶ If you did not select **networker**, **onc**, or **tcpip**, go to **step 59**.
- ▶ If you selected the **networker** package, go to the following section on answering Data Backup Utility package setup questions and proceed with **step 46**.
- ▶ If you selected **onc** but did *not* select **networker**, go to the section on answering ONC package setup questions and proceed with **step 56**.
- ▶ If you selected **tcpip** but did *not* select **networker** or **onc**, go to the section on answering TCP/IP package setup questions and proceed with **step 58**.

Answering Data Backup Utility package setup questions

How the installer program sets up the Data Backup Utility package depends on whether you are setting up your system as a client that will back up its files to a remote NetWorker server, or as a local-only backup server (your system backs up its own files).

46. Decide if this host will run as part of a DG/UX cluster.

- ▶ If this is a standalone system and not part of a DG/UX cluster, accept the **no** default by pressing Enter. For example:

```
Is this system being set up as a node within a
cluster? [no] ↵
```

- ▶ If this system will be a node in a DG/UX cluster, type **yes** and press Enter. For example:

```
Is this system being set up as a node within a
cluster? [no] yes ↵
```

47. Decide if this host backs up its files to a remote NetWorker server or if it is a local-only server that backs up its own files.

Worksheet 7

- If this host backs up files to a remote NetWorker server, type **yes** and press Enter. For example:

```
Configure system as a client for a remote NetWorker
server? [no] yes ↵
```

If you answer **yes**, there are no more questions about this package. Go to **step 55**.

- If this host will back up its own files locally, accept the **no** default by pressing Enter.

```
Configure system as a client for a remote NetWorker
server? [no] ↵
```

48. Carefully read the screen note about virtual disk requirements.

You now have the opportunity to create or adjust the size of the /var/opt/networker file system. This file system is needed to store the NetWorker online index and log files. The default size of 10000 blocks is enough space to store index information for multiple versions of several thousand files – about enough for a small workstation with a single disk drive. THIS IS NOT ENOUGH SPACE FOR A SERVER WITH REMOTE CLIENTS! If your system has more than one disk drive, or if it will be acting as a NetWorker server for remote clients, you probably need to allocate additional space for the online index.

The installation utility presents a table similar to the following, showing default requirements for creating, sizing, and mounting the online index:

/var/opt/networker file system:

File System	Virtual	Current	Action	Blocks	Physical
Mount Point	Disk	Blocks	Required	To Add	Disk
-----	-----	-----	-----	-----	-----
/var/opt/networker	var_opt_networker	-	Create	10000	sd(apsc(pci(1),f),0)

Modify this information? [no]

49. Decide if you need to modify the default values presented in the table.

- To accept the default values presented in the table, press Enter. For example:

```
Modify this information? [no] ↵
```

- If you are setting up the **onc** package, go to **step 56**.

- If you are setting up the **tcpip** package, but *not* the **onc** package, go to **step 58**.

- To modify any of the information in the table, enter **yes**. For example:

```
Modify this information? [no] yes ↵
```

The installation utility presents a series of prompts similar to the following:

```
Mount a virtual disk at /var/opt/networker? [yes]
```

- 50. To accept the default mount point, press Enter as shown below; otherwise, select another mount point.**

IMPORTANT Do not change the mount point if you might upgrade your operating system to the next release at some future date. The installation utility has no way of locating the correct virtual disk to upgrade if you change the mount point.

```
Mount a virtual disk at /var/opt/networker? [yes] ↵
Virtual disk to mount at /var/opt/networker: [var_opt_networker]
```

- 51. Type the desired virtual disk name, or to accept the default name, press Enter. For example:**

```
Virtual disk to mount at /var/opt/networker: [var_opt_networker] ↵
Size (in blocks) for var_opt_networker: [10000]
```

IMPORTANT If you changed the default mount point, you must also change the virtual disk name.

- 52. Type the desired block size, or to accept the default block size, press Enter. For example:**

```
Worksheet 5      Size (in blocks) for var_opt_networker: [10000] 50000 ↵
                  Physical disk for var_opt_networker:[sd(apsc(pci(1),f),0)]
```

- 53. Type the alternative physical disk name, or to accept the default drive name, press Enter. For example:**

```
Worksheet 5      Physical disk for var_opt_networker:[sd(apsc(pci(1),f),0)] ↵
```

IMPORTANT If you plan to install the DG/UX Cluster Software product, you must specify a dual-initiator physical disk.

After you complete the desired changes for the virtual disk, the installation utility presents a table similar to the following that lists your modifications:

var/opt/networker file system:

File System Mount Point	Virtual Disk	Current Blocks	Action Required To	Blocks Add	Physical Disk
-----	-----	-----	-----	-----	-----
/var/opt/networker	var_opt_networker	-	Create	50000	sd(apsc(pci(1),f),0)

Modify this information? [no]

- 54. To make further changes, type yes and return to step 49. To accept the values presented in the table, press Enter. For example:**

Modify this information? [no] ↵

The system displays the following messages while setting up the Data Backup Utility:

```
Creating /dev/dsk/var_opt_networker (50000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "var_opt_networker" created.
Virtual disk "var_opt_networker" made a volume.
Making file system on /dev/dsk/var_opt_networker
Mounting /dev/dsk/var_opt_networker.
```

- 55. Continue with package setup questions.**

- ▶ If you are setting up the **onc** package, continue with **step 56**.
- ▶ If you are setting up the **tcpip** package, but *not* the **onc** package, go to **step 58**.

Answering ONC package setup questions

To set up ONC (Open Network Computing), you must supply the NIS domain name that you recorded in **Planning Worksheet 7** in Appendix A.

- 56. Type the NIS domain name for your installation ("worknet" in this example) and press Enter. For example:**

Worksheet 7 Enter the NIS Domain name: **worknet** ↵
[worknet] Correct? [yes]

- 57. Confirm the NIS domain name, or correct it by answering no and responding again. For example:**

[worknet] Correct? [yes] ↵

A completion message appears when the **onc** package is set up successfully. Go to the section on answering TCP/IP questions that follows and proceed with **step 58**.

Notes on ONC and NFS

Initially, your computer runs as an NIS client. ONC and NFS may require further setup (such as changing your host from an NIS client to either an NIS master or NIS server). Refer to *Managing ONC[™]/NFS[®] and Its Facilities on the DG/UX[®] System* for instructions on further configuring ONC and NFS.

You can find a detailed account of the ONC and NFS root setup in **onc.root** and **nfs.root** log files located in the directory **/var/setup.d/log**.

Answering TCP/IP package setup questions

To set up TCP/IP, you supply information that you recorded in **Planning Worksheet 7** from Appendix A.

If you are doing an upgrade installation, you will be asked if you want to keep the current values of your TCP/IP parameters (i.e., primary hostname, Internet address, controller name).

The exact text of your screen dialog depends on whether your computer has one or more Ethernet LAN controllers.

IMPORTANT You set up a token ring or FDDI controller *after* the DG/UX system installation is complete. For details, refer to the section on maintaining network interfaces in *Managing TCP/IP on the DG/UX[®] System*.

58. Enter the network configuration information recorded in **Planning Worksheet 7** from Appendix A.

Refer to whichever of the following samples for this step is appropriate for your system's Ethernet LAN configuration. The Ethernet LAN device names may vary slightly depending on your computer model. (The values **moe**, **128.222.2.1**, **0xffffffff00**, and the Ethernet controller device configurations in the sample dialogs are examples only.)

Single Ethernet LAN controller

The following queries refer to the primary network interface:

```
Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffffff00 ↵
[0xffffffff00] Correct? [yes] ↵
```

NOTE: Using "dpen(pci(0),C,0)" as the primary network interface controller.

Multiple Ethernet LAN controllers

The following queries refer to the primary network interface:

```
Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] yes ↵
Enter the network mask: 0xffffffff00 ↵
[0xffffffff00] Correct? [yes] ↵
```

The following Ethernet controller devices are configured on this system

```
dpen(pci(0),C,0) cien0 cien1
```

```
Enter controller device name: [dpen(pci(0),C,0)] ↵
```

No Ethernet LAN controller

The following queries refer to the primary network interface:

```
Enter host name: moe ↵
[moe] Correct? [yes] ↵
Enter host Internet address: 128.222.2.1 ↵
[128.222.2.1] Correct? [yes] ↵
```

WARNING: No Ethernet controllers are configured on this system. A primary network interface will not be added at this time. You can add TCP/IP network interfaces later through sysadm(1M).

Notes on TCP/IP

The files **tcpip.root** and **tcpip.usr**, located in the directory **/var/setup.d/log**, contain a verbose description of the **tcpip** package setup process.

Additional TCP/IP setup may be required, depending on your network and site configuration. Consult *Managing TCP/IP on the DG/UX[®] System* for information on the following additional TCP/IP features: routing, Domain Name System (DNS), server program and daemon management, SNMP, sendmail, and network databases.



For security installations, additional setup may be required to customize the way your security system works with the TCP/IP product. For information about Trusted IP networking, see *Managing Security on the DG/UX[®] System*.

After answering the package setup questions

59. Review the following options:

If you previously answered **yes** to the expedite installation query, at this point it will take the installer utility up to one hour to load the packages. Periods (.) are written to the screen at regular intervals to indicate that the packages are being loaded.



After loading is complete, security installers who have not already set up security accounts will be prompted for passwords. Refer to your security notice for instructions on assigning passwords, then return here to continue the installation.

- ▶ If you answered the kernel build questions before loading and answered **yes** to the automatic boot query, you will see the following message when the installer utility completes:

```
DG/UX System Release Rn.nn
Console login:
```

At this point, go to Chapter 7 to complete the installation.

- ▶ If you did not answer kernel build questions before loading, proceed with the rest of this chapter to build and boot a kernel.
- ▶ If you answered kernel build questions before loading, but answered **no** to the automatic boot query, go to the section on booting a kernel and proceed with **step 64**.

Building and booting a new kernel

You must build and boot a new kernel for the DG/UX product you installed. After setting up the packages, you are ready to build the DG/UX kernel for your new configuration.

The installer program builds a kernel using configuration data about devices, device drivers, streams modules, and socket protocols for the DG/UX system and software packages. It uses default values for general configuration variables. After you complete this installation, you may need to reconfigure your kernel, setting selected variables to different values. For information on tunable variables, refer to *Managing the DG/UX® System*.

Files in the directory **/usr/etc/master.d** list the configuration variables and default values for kernel builds. The kernel is located in the file **/dgux** on the **root** virtual disk.

Building a kernel

After package setup completes, the DG/UX installer program prompts you to build a custom kernel for your system.

5. Configure and Build kernel

```
Run this step now?: [yes] ↵
System configuration file name: [aviion]
```

60. Assign a name for your system configuration file or accept the default name. For example:

```
System configuration identifier: [aviion] ↵
[aviion] Correct? [yes]
```

The default (in brackets) is the hostname supplied during **tcpip** package setup. If you did not perform **tcpip** package setup, the generic filename, **aviion**, is the default. We recommend selecting a unique name for your system configuration file. For example:

```
System configuration identifier [aviion] moe ↵
New [moe] system files? [yes]
```

61. Confirm the name by pressing Enter. For example:

```
New [moe] system files? [yes] ↵
Operating system client? [no]
```

62. Indicate whether you are building the kernel for this host or for an operating system client.

```
Operating system client? [no] ↵
```

Since you are upgrading the DG/UX system on the host, the host must have its own disks for the operating system. Therefore, you should accept the default for this prompt.

63. Decide whether to reboot after building the kernel.

```
Automatically reboot after building kernel? [yes]
```

If you answer no, the installation program terminates and you will need to reboot the system for the new kernel to take effect.

When the kernel is built, continue with the section below to boot the new kernel.

Booting the kernel

After the kernel builds successfully, the installer utility prompts you to boot the kernel you just built.

CAUTION *If you used a boot floppy and have not removed it from the diskette drive, you must do so now, before rebooting the kernel.*

```
6. Reboot kernel
```

```
Run this step now? [yes] ↵
```

```
Boot path: [sd(apsc(pci(1),f),0) root -f /dgux -i 3]
```

64. To accept the default boot path and run level, press Enter. For example:

```
Boot path: [sd(apsc(pci(1),f),0)root:/dgux -3] ↵
```

```
All currently running processes will be killed.
```

```
Are you sure you want to reboot the system? [yes]
```

Note that, as this example illustrates, you boot the new kernel to a run level of 3 (multi-user mode with network services).

65. To reboot the system now, press Enter. For example:

```
Are you sure you want to reboot the system? [yes] ↵
```

The screen clears and the new kernel boots, displaying startup and other informative messages similar to the following. Remember that the physical disk names will vary slightly depending on the type of media and the platform you are using.

```
Booting sd(apsc(pci(1),f),0) root -f /dgux -i 3
DG/UX System Release Rn.nn Bootstrap
Loading image .....
DG/UX System Release Rn.nn, Version generic
```

```

Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .....
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file
system.

Creating /dev .... .

.  <additional messages>
.
.
NOTE:  The run level change is complete.  See
       /etc/log/init.log for a verbose description of
       the system initialization process.

```

IMPORTANT If instead of rebooting, your system displays the Boot command: **prompt**, you must enter the **boot** command for your system. For example, to boot to init level 3, you might enter:

```
Boot command: sd(npssc(cpci(),3),0) root -f /dgux -i 3 ↵
```

You can use the command above, substituting the boot device name for your system in place of **npssc(cpci(),3)**. If you are not sure of the boot device name for your system, refer to your notice. For more information on using the **boot** command, refer to Appendix C.

If the kernel encounters a device it cannot configure, it displays an error message and continues configuring the remaining devices. Depending on the circumstances, you may choose either to investigate and correct the problem on the spot, or postpone investigation until after your DG/UX system is operational. If, for example, a particular device requires repair, it might be prudent to complete your installation and work temporarily without that device.

IMPORTANT If you receive an error message indicating that a package has not been set up, perform package setup using **sysadm** after you complete installation.

When the DG/UX system has finished booting, the login prompt appears.

```

Press New Line to continue.  ↵
moe
DG/UX Operating System Rn.nn
Console Login:

```

If you are using a graphics monitor, do not log in at the login prompt. Within a few seconds, a login screen will appear. Chapter 7 explains how to log in and complete your installation.

Where to go next

At this point, your DG/UX system is installed. Before your system is fully operational, however, you may need to further customize the operating environment.

First, make sure you set up the DG/UX documentation CD-ROM and can read the DG/UX manuals as described in the documentation provided with the CD-ROM.

Then go to Chapter 7 to log in and complete your installation.

End of Chapter

4

Upgrading your DG/UX system

This chapter explains how to upgrade from the last major DG/UX release (with or without installed maintenance updates) to the current DG/UX release. Refer to your notice for the upgrade paths to the current release.

This chapter includes the following major sections:

- Changing your configuration
- Keeping customizations and your old system file
- Upgrading on hosts in a dual-initiator configuration
- Preparing for the upgrade
- Loading the installation utility
- Building the kernel for an upgrade
- Booting the kernel for an upgrade
- Sample upgrade dialog
- Restoring files from tape
- Where to go next

To complete an upgrade, perform the steps shown in Figure 4–1.

IMPORTANT The upgrade method explained in this chapter makes the system unavailable to users during the upgrade. If you want to keep the system available to users during the upgrade and you have enough disk space for two operating system versions, consider performing a stand–aside installation. For more information, see Chapter 6.

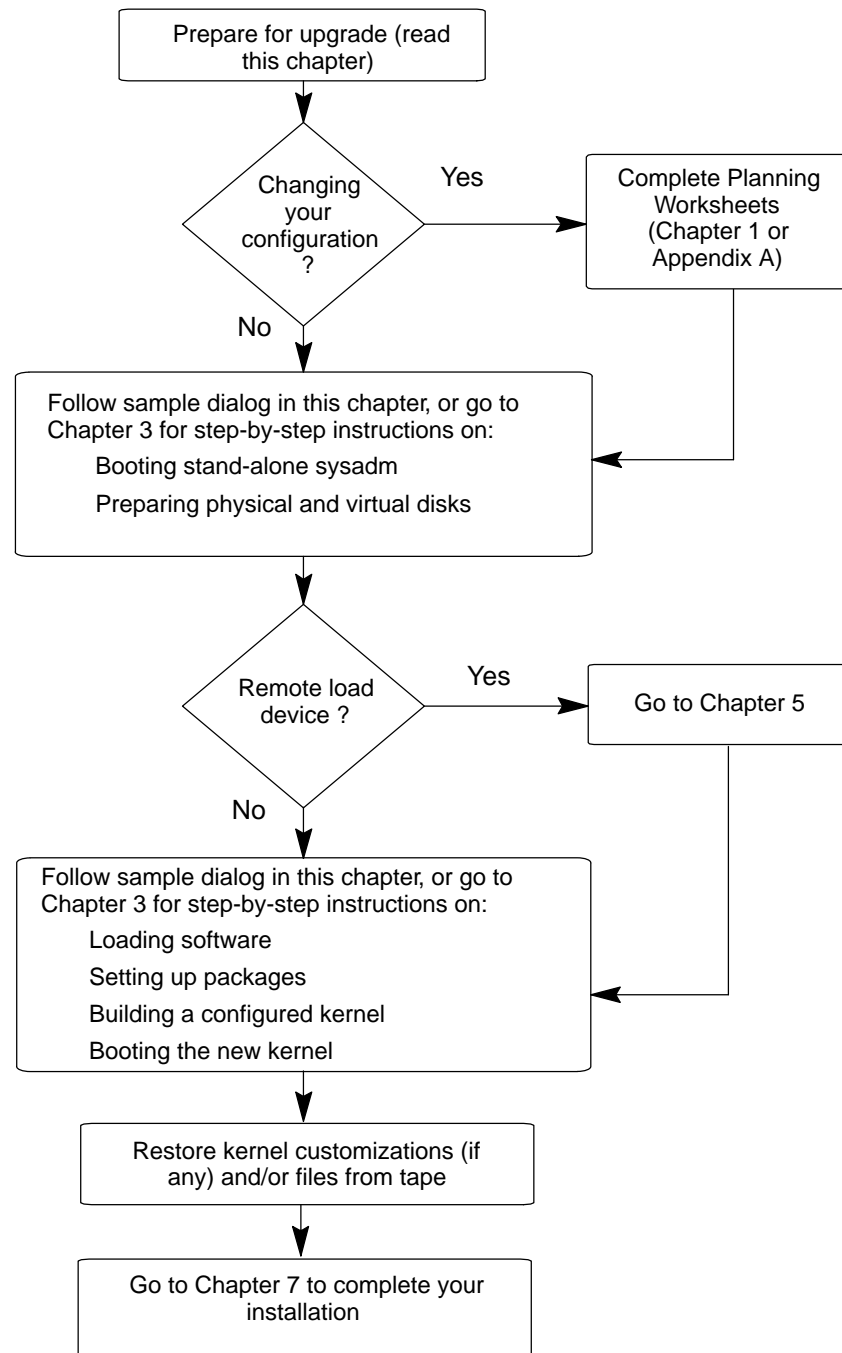


Figure 4-1 Summary of upgrading tasks

Changing your configuration

If you plan to change any network parameters, virtual disk sizes, selection of packages, or other default system components, complete the Planning Worksheets as described in Chapter 1 before proceeding. If you are keeping the same configuration as your existing DG/UX system, you simply accept defaults at most installer program prompts.

If you intend to change the default values for the software packages on the **usr_opt_networker** and **usr_opt_X11** virtual disks, refer to the general procedure for this outlined in Chapter 3 in the section on modifying the default virtual disks for optional software packages.

If you plan to change the default configuration to set up a **/var** file system independently of the **root** file system, you will need to add an entry to the **/etc/inittab** file to mount **/var**. If you do not do this, you will not be able to boot to init 3 because the init process will attempt to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following two lines to your **/etc/inittab** file to mount the independent **/var** file system:

```
mnt::sysinit:/sbin/fsck -pxl /var </dev/console >/dev/console 2>&1
var::sysinit:/sbin/mount /var </dev/console >/dev/console 2>&1
```

You must add these lines immediately after the line defining the default run level (that line starts with **def** and looks similar to this: **def:3:initdefault:**). You can edit the **/etc/inittab** file from init level s, after which you should halt the system and reboot.

Keeping customizations and your old system file

When you upgrade from the previous to the current DG/UX release, the system may ask during installation if you want to retain your existing device and parameter customizations or to override them with the system defaults. You will have the choice to retain or override the your existing customizations at that time.

The system configuration file, **/var/Build/system.name**, is compiled from two files: **system.device.name** and **system.params.name**, where *name* is the name you assign to the system configuration file (typically, the name of the host server). This arrangement gives you the choice of confining changes to only devices or to only the kernel tunable parameters and software package attributes.

You do not edit the **/var/Build/system.name** file directly. Instead, you edit its separate components, the **system.device.name** file and the **system.params.name** file, during installation. You can edit either file, both files, or neither one if you want to use the default configuration.

IMPORTANT Entering your kernel customizations to **system.device.name** and **system.params.name** is a one-time event. Subsequent kernel building sessions will update the kernel using the customized files as a base.

To set up kernel parameters for packages not included on the DG/UX medium (Netware, OSI/P, PICK, SNA, X.25, and so on), refer to the individual notices for these products.

Upgrading on hosts in a dual-initiator configuration

You can skip this section if:

- You do not use the DG/UX Cluster Software product.
- You are adding a new system to an existing dual-initiator configuration.
- You are certain the local host in your existing dual-initiator configuration does not own any dual-initiator disks.

If you are running hosts in a dual-initiator configuration as supported by the DG/UX Cluster Software product, you need to make special preparations before upgrading the DG/UX system on those hosts. In this section, the host on which you boot or install the DG/UX system is referred to as the “local” host, and the other host is the “remote” host.

If you are upgrading the DG/UX system on a host in an existing dual-initiator configuration, make sure the remote host takes ownership of the dual-initiator disks before you start. This minimizes the downtime of the configuration as a whole.

While the SCSI bus operating parameters should have been set before the DG/UX system was first booted on the local host, you should still check these parameters to make sure they are correct. Refer to the 014-series operating manual for your hardware model.

For how to determine if the local host owns a dual-initiator disk, see the DG/UX Cluster Software documentation.

Preparing for the upgrade

To ensure a successful upgrade, we strongly recommend you do the following before you actually begin:

- Verify adequate free space.
- Back up files to tape.
- Prepare attached hardware devices.

Before beginning an upgrade, you can expand the size of a virtual disk by adding contiguous partitions. You can add noncontiguous partitions to **root** and **usr** as long as they reside on the same physical disk. For information on using **sysadm** to expand virtual disks, refer to the *Managing Mass Storage Devices and DG/UX[®] File Systems* manual.

Verifying free space

Your **root** and **usr** virtual disks must have sufficient additional free space to ensure a successful upgrade. The amount of free space needed depends on the location and size of existing files and the packages you intend to load.

Your notice lists minimum sizes of virtual disks. These guidelines assume that your / (root) and /usr file systems do not contain extraneous files.

You can check available free space and perform manual cleanup before starting the upgrade, or you can rely on the installation utility to check free space during the actual upgrade process. Freeing space before you start the upgrade expedites the upgrade procedure and improves your chances of a successful upgrade. Even if you perform manual cleanup now, the installation utility automatically will perform an additional check during the upgrade process. If you forgo manual cleanup entirely, the utility-assisted cleanup operation can be time-consuming.

► **To forgo manual cleanup before the upgrade, skip the remainder of this section and go to the next section. Otherwise, continue reading this section for manual cleanup suggestions.**

To determine the number of free blocks in the / and /usr file systems currently mounted on your system, use the **df** command. For example:

```
# df /usr ↵
```

```
/          (/dev/dsk/root  ):    26097 blocks      4994 files
/usr       (/dev/dsk/usr   ):    42836 blocks      26473 files
```

To increase free space before you begin the upgrade procedure, become superuser and remove these files:

- Large files in **/tmp** and **/var/tmp** (unless you have a **tmp** virtual disk mounted at **/** and **/var**).
- **lost+found** files in **/** and **/usr**.
- Large log files such as **/var/adm/messages**, **/var/cron/log**, **/etc/log/fast_fsck.log**, and anything in the **/var/adm/log** directory.
- Saved text editing sessions, such as files in directories under **/var/preserve**.
- Extra kernels (such as **/dgux***) in **/** and **/var/Build**.
- Site-supplied executables in directories such as **/local** or **/usr/local**.
- Any files unrelated to the operating system.
- Core files.
- Obsolete files in the **/usr/admin** and **/usr/lib/gcc-1** directories.

Backing up files to tape

We strongly recommend that you back up all file systems on the system disk before upgrading your system, including the **/** (root), **/usr**, **/usr/opt/networker**, **/usr/opt/X11**, and **/usr/opt/sdk** file systems. Do not back up **swap** or **dump**, because they are not file systems. A backup allows you to restore your DG/UX system to its previous operating state, if necessary.



SECURITY

If you have an A&A database on a separate file system, we recommend backing it up before upgrading your system.

You will need a dump medium to back up a system disk; for example, a QIC-150 cartridge tape. The **/etc/dumptab** file lists supported dump device media. If you are using a cartridge tape, make sure it is write-enabled: the arrow should point away from the SAFE position.

If you use the Data Backup Utility or Legato NetWorker as your archiving mechanism, use it to perform the system backup. Refer to the product documentation instead of this section for details.

Otherwise, you can use **dump2** procedures to perform system backup. Follow these steps:

1. **Insert a blank tape in the tape drive, and close the drive door.**
2. **For the generic DG/UX product: at the shell prompt, issue the su command followed by the superuser password.**

For information security products: assume the sysadmin role and enter the sysadmin password.

3. **At the shell prompt, issue the dump2 command in the following form:**

```
# /usr/sbin/dump2 -0 -f /dev/rmt/0n /
```

where:

-0 (zero)	Specifies the entire file system.
-f /dev/rmt/0n	Identifies the tape drive on which you want to back up the file system; n specifies no-rewind mode. If you do not know your tape drive's name, check the /etc/devlinktab file or list the /dev/rmt directory to obtain a list of configured tape drive names.
/	Is the name of the file system you want to back up.

The **dump2** command prompts you to insert additional tapes if necessary.

4. **Repeat this procedure for each file system you want to back up.**

IMPORTANT For the final file system you back up, omit the no-rewind option (**n**) from the tape drive name so that the tape rewinds at the conclusion of the file dump.

5. **Remove the tape from the tape drive when you have finished backing up the desired files.**

The section on restoring files from tape in this chapter explains how to restore a file system that you backed up.

Preparing hardware devices

Before you begin the upgrade procedure, make sure all device power cables are connected. If a device is disconnected, power down the system before you connect it.

For devices requiring a removable recording medium (such as a diskette or optical disk), make sure that the correct medium is inserted in the drive and that the drive door is closed.

CAUTION *WORM (Write-Once Read-Many) devices are the exception to this rule. A write operation to a WORM disk can destroy the contents of the disk. If you have a WORM device in your configuration, power it down before you begin the upgrade to prevent the installation utility from preparing (writing) that disk. After you complete the upgrade, turn on power to the device and configure it in the system file.*

Setting up a dual-initiator configuration

In a dual-initiator disk configuration, one SCSI bus cable connects two computer systems, either directly or (more commonly) daisy-chained through one or more SCSI disk devices such as a CLARiiON[™] disk array.

Check the SCSI bus parameters every time you install or upgrade the DG/UX software. Unset or incorrectly-set parameters will cause a system halt on the remote host. You must set the parameters before booting a DG/UX installer kernel or autoconfigured DG/UX custom kernel.

IMPORTANT Do not boot a DG/UX installer kernel or autoconfigured DG/UX custom kernel in an active dual-initiator configuration before setting the SCSI bus operating parameters. If you cannot set the parameters first, you may have to shut down the remote host or disconnect the shared SCSI bus from the local host before booting such a kernel.

Shutting down your DG/UX system

To upgrade your DG/UX system, first you must shut down your computer. To accomplish this in an orderly fashion, use the following procedure.

1. **If you are running in the X Window System, log out, and then exit the login screen by clicking on the Terminate button.**
2. **Log in as root, or as sysadm on security systems.**
3. **Change to the root (/) directory using the following command:**

```
# cd /
```

4. **Shut down the system using the following command:**

```
# shutdown -g0 -y
```

This command broadcasts an announcement to all logged-in users informing them of the impending shutdown. The `-y` option overrides the confirmation prompt. This command provides no grace period (0 second). For multi-user systems, you may want to give users a grace period of at least 5 minutes.

The actual time required to shut down the system depends on the number of file systems being unmounted. Messages similar to the following will appear:

```
Shutdown started.          <Day Month date time year>...
```

```
INIT:   run level:  S
INIT:   SINGLE USER MODE
```

5. **Halt all processors. To halt the processors without prompting for confirmation, use the following command:**

```
# halt -q
```

```
DG/UX system shutdown complete.
```

- On SCM-equipped systems, the DG/UX system shutdown complete message is immediately followed by the `SCM>` prompt. When the `SCM>` prompt appears, the DG/UX system is completely shut down and the SCM program is in control of your machine. At this point, you can turn off your computer.
- Systems that are not equipped with an SCM will immediately re-enter the powerup sequence, which includes a default boot attempt. Therefore, you must power off your computer.

Loading the installation utility

In this section, you begin the installation upgrade process by loading the installation utility from the system console. Refer to the section below that pertains to your system.

Loading the installation utility on systems with an SCM

Follow the instructions in this subsection if you are upgrading a system that has an SCM.

IMPORTANT For a list of computer models that come with an SCM, see your notice. If you do not see an SCM prompt after you power on the machine, use the instructions in the following section on loading the installation utility without an SCM to boot from a boot floppy.

If your system is powered off, you must turn it on and wait for the SCM prompt before you can begin the boot process. If you are already running the DG/UX software, you must initiate an orderly system shutdown using the **halt** or **shutdown** commands. The system then will reset and bring up the SCM prompt.

- ▶ Insert the DG/UX release medium in the CD-ROM drive.
- ▶ Boot the medium by typing the appropriate boot command at the SCM prompt, and press Enter. Consult your completed planning **worksheet 2** in Appendix A or your notice for the name of your boot device. For example:

```
SCM86> b sd(apsc(pci(1),f),5) ↵
```

The installation utility will proceed to load.

Loading the installation utility on systems without an SCM

Follow the instructions in this subsection if you are upgrading a system that does *not* have an SCM.

IMPORTANT For a list of computer models that come with an SCM, see your notice.

Before you begin the boot process, make sure your system is powered off.

- ▶ Insert the DG/UX release medium (CD-ROM) and the boot floppy (diskette) in their respective drives.

IMPORTANT The boot floppy is not required if your system was previously set up to boot from the hard disk. If this is the case, when you power on your system, you will see the automatic-boot count-down message:

DG/UX will boot in xx seconds

To interrupt the automatic boot from disk, press the <Esc> key before the count-down message completes. This will display the Boot command: prompt, and you can enter the name of the boot device as explained below.

- ▶ Power on your system. The system will reset, boot the installation floppy, and display the following prompt:

Boot command:

- ▶ Enter the name of the CD-ROM boot device at the prompt. Enter *only* the name of the device. See your completed planning **worksheet 2** or your notice for the name of your boot device. For example:

Boot command: `sd(apsc(pci(1),f),5)` ↵

IMPORTANT Do NOT type: `b device_name`.

- ▶ You can remove the boot floppy from the diskette drive at any time now. The boot floppy provides the Boot command: prompt. You may choose to leave it in the drive until you are sure that you don't need to start over, but you must remove the boot floppy from the drive before you reboot the configured kernel.

The installation utility will proceed to load.

Beginning the boot process

You have now loaded the installation utility. You can either follow the dialog in the sample upgrade dialog section later in this chapter, or you can refer to the step-by-step instructions in the section on beginning the installation in Chapter 3.

If you want to keep your old system file that has been custom-tuned, first perform the upgrade and then refer to the section on restoring kernel customizations at the end of this chapter.

If you elect to answer the kernel build questions before loading the software packages, we suggest you follow the example in the sample dialog section later in this chapter.

IMPORTANT If you prefer to only load essential packages now, and then add others later, refer to instructions on loading and setting up application software in *Managing the DG/UX[®] System*.

If you do not answer the kernel build questions before loading the software, then after you prepare the physical and virtual disks, and load and set up the software, you can return here to the following section on building the kernel for an upgrade.

Building the kernel for an upgrade

This section contains step-by-step procedures for building a new kernel after you upgrade your DG/UX software. This section assumes you did not elect to answer the kernel build questions before loading the software packages. If you answered the kernel build questions earlier, you can refer to the sample dialog section later in this chapter.

After package setup completes, the DG/UX installer program prompts you to configure and build a kernel for your system. If you choose to save a copy of your previous system file, it saves the backup copy in the **system.name.old** file. If you want to retain customizations from that system file, you can choose to do so during the upgrade.

If you run software applications that write to the system file (for example, Netware, X.25, SNA, and so on), you can add the customizations for these applications to the **system.params.name** or **system.device.name** file during this process. These customizations will be included in the new kernel.

1. To configure and build the kernel, press Enter at the initial prompt. For example:

```
5. Configure and build kernel
```

```
Run this step now? [yes] ↵
```

```
System configuration identifier: [moe]
```

IMPORTANT You can choose not to configure and build your kernel at this time. However, you must configure and build a new kernel before you can boot the software upgrade. For how to configure and build a kernel after you complete an upgrade, see *Managing the DG/UX® System* or the **admkernel(1M)** man page.

2. Assign a name to your system configuration file or accept the default name. For example:

```
System configuration identifier [moe] ↵
```

The default (in brackets) is the hostname supplied during **tcpip** package setup. If you did not perform **tcpip** package setup, the generic filename, **aviion**, is the default. We recommend selecting a unique name for your system configuration file.

3. The next prompt you see depends on whether the `system.name` configuration file already exists.

- If the **`system.name`** file exists, you see the following prompt:

```
[moe] Correct? [yes]
```

If you want to overwrite the **`system.name`** configuration file with the contents of the **`system.device.name`** and **`system.params.name`** files, accept the default [yes] by pressing Enter. For example:

```
[moe] Correct? [yes] ↵
Operating system client? [no]
```

If you answer **no**, you will return to the System configuration identifier prompt where you can enter a new identifier name under which to build your system kernel.

- If the **`system.name`** configuration file does *not* exist, you are asked to confirm the name by pressing Enter. For example:

```
New [moe] system files? (yes) ↵
Operating system client? [no]
```

4. Answer if this host is an operating system client of another host.

Since you are upgrading the DG/UX system on the host, the host must have its own disks for the operating system. Therefore, you should accept the default for this prompt.

```
Operating system client? [no]↵
```

5. The next prompt depends on whether or not your system already has a `system.device.name` file.

- If your system does *not* have a **`system.device.name`** file, continue with **step 6**.
- If your system does have a **`system.device.name`** file, you are asked if you want to retain this device configuration file.
- Accept the default **retain** if you added customizations to the device configuration file and want to keep them. For example:

```
Device configuration file: [retain] ↵
```

- Enter **regenerate** after the prompt if you want to use the default devices defined in the operating system upgrade. Regenerating the device configuration file overwrites your customizations, replacing them with the system defaults. For example:

```
Device configuration file: [retain] regenerate ↵
```

- Type ? if you want more information.

6. The next prompt depends on whether or not your system has a **system.params.name** file.

- ▶ If your system does *not* have a **system.params.name** file, proceed to **step 8**.
- ▶ If your system does have a **system.params.name** file, you are asked if you want to retain this parameter configuration file.

- Accept the default **retain** if you added customizations or tunable parameter values to the parameter configuration file and want to keep them. For example:

```
Parameter configuration file: [retain] ↵
```

- Enter **regenerate** after the prompt if you want to use the default parameters shipped with the operating system upgrade. Regenerating the parameter configuration file overwrites customizations and tunable parameter settings, replacing them with the system defaults. For example:

```
Parameter configuration file: [retain] regenerate ↵
```

- Type ? if you want more information.

7. Decide if you want to include new package proto files.

A *package proto file* is the prototype kernel configuration file, if any, included as part of the software package. It specifies the kernel configuration parameters required by the package, as well as pseudo-devices, protocols, STREAMS modules, and other software components provided by that package.

- ▶ Accept the default **yes** and include the new package proto files if you want to immediately start using the features of any new packages loaded as part of the upgrade. For example:

```
Include new package proto files? [yes] ↵
```

If you are not sure, type ? for a list of the packages loaded, but not configured. If you are still not sure, accept the default and include the proto files.

- Answer **no** and do not include the new package proto files if you do not want to use the new packages immediately and want to keep the DG/UX kernel image as small as possible. For example:

```
Include new package proto files? [yes] no ↵
Automatically reboot after building kernel? [yes]
```

8. Decide whether or not to reboot automatically after building the kernel.

- If you prefer to pause between kernel building and booting (for example, to verify a successful kernel build or the boot path), answer **no** after the prompt and press Enter. For example:

```
Automatically reboot after building kernel? [yes] no ↵
OK to perform this operation? [yes]
```

- To expedite installation, accepting the default **yes** response causes the kernel to boot automatically after it is built. For example:

```
Automatically reboot after building kernel? [yes] ↵
OK to perform this operation? [yes]
```

9. When you are ready to begin building the kernel, press Enter.

```
OK to perform this operation? [yes] ↵
.
.
.
Building kernel.....
Successfully built dgux.moe
```

```
Linked /dgux. You must reboot in order for this kernel to
take effect.
```

If you choose to automatically reboot after rebuilding the kernel, proceed to Chapter 7 to complete your installation. To restore files you backed up to tape before the upgrade, refer to the section on restoring files from tape in this chapter.

Booting the kernel for an upgrade

After the kernel builds successfully, the installer utility prompts you to boot the kernel you just built.

IMPORTANT The physical disk names on your system may vary slightly from the examples depending on your computer model.

10. To boot the kernel, press Enter at the initial prompt.

```
6. Reboot kernel
```

```
Run this step now? [yes] ↵
```

```
Boot path: [sd(apsc(pci(1),f),0)root:/dgux -3]
```

11. To confirm the boot path and run level, press Enter.

Note that, as this example illustrates, you boot the new kernel to a run level of 3 (multi-user mode with network services.).

```
Boot path: [sd(apsc(pci(1),f),0)root:/dgux -3] ↵
```

```
All currently running processes will be killed.
```

```
Are you sure you want to reboot the system? [yes]
```

12. To confirm that you are ready to reboot the system now, press Enter. For example:

```
Are you sure you want to reboot the system? [yes] ↵
```

The screen clears and the new kernel boots, displaying startup and other informative messages similar to the following.

IMPORTANT If instead of rebooting, your system displays the Boot command: prompt, you must enter the **boot** command for your system. For example, to boot to init level 3, you may type:

```
Boot command: sd(npssc(cpci(),0),0) root -f /dgux -i 3↵
```

You can use the command above, substituting the device name for your system in place of **npssc(cpci(),0)**. When you see the login screen, proceed to Chapter 7 to complete your installation.

If you are not sure of the boot device name for your system, refer to your notice. For more information on using the **boot** command, refer to Appendix D.

```

Booting sd(apsc(pci(1),f),0)root:/dgux -3
DG/UX System Release Rn.nn Bootstrap
Loading image .....
DG/UX System Release Rn.nn, Version generic
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .....
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file
system.

Creating /dev ....

. <additional messages>
.
.
    NOTE: The run level change is complete. See
          /etc/log/init.log for a verbose description of
          the system initialization process.

```

IMPORTANT If you receive an error message indicating that a package has not been set up, perform package setup using **sysadm** after you complete installation.

If the kernel encounters a device it cannot configure, it displays an error message and resumes configuration of the remaining devices. Depending on the circumstances, you may choose either to investigate and correct the problem on the spot or postpone investigation until your DG/UX system is operational. If, for example, a particular device requires repair, it might be prudent to complete your upgrade and work temporarily without that device.

When the DG/UX system has finished booting, the login prompt appears.

```

Press New Line to continue. ↵
moe
DG/UX Operating System
Console Login:

```

IMPORTANT If you are using a graphics monitor, do not log in at the login prompt. Within a few seconds, a login screen will appear. Chapter 7 explains how to log in and complete your installation.

Sample upgrade dialog

This section contains a typical dialog for a DG/UX system upgrade on a machine named **moe** using a local CD-ROM device. Follow this sample dialog as you upgrade your own system.

In the sample dialog, user responses such as answering questions appear in boldface and pressing the Enter key is represented by the ↵ symbol.

IMPORTANT You'll see an estimate of elapsed time in the left margin, using the form hours:minutes. Note that the elapsed times in this example reflect a particular hardware and software configuration; installation times vary according to your system's configuration.

```

0:00      SCM/jp0> b sd(apsc(pci(1),f),5) ↵

          Booting sd(apsc(pci(1),f),5)
          DG/UX System Release Rn.nn Bootstrap

          Loading image.....
          DG/UX System Release Rn.nn, Version Standalone sysadm
          Using 32 Megabytes of physical memory
          Found 2 processors
0:05      Configuring devices .....
          Registering disks ..
          Running with no swap area.
          Using memory-resident root file system
          Creating /dev ....

          INIT: SINGLE USER MODE

          Standalone Sysadm Main Menu

          1 Physical Disk ->    Manage physical disks
          2 Virtual Disk ->    Manage virtual disks
          3 File System ->     Manage file systems
          4 Install Software -> Install system software

          Enter a number, a name, ? or <number>? for help, <NL> to take
          the default, or q to quit: [Install Software] ↵

```

Install System Software Menu

- 1 Prepare physical disks ...
- 2 Prepare virtual disks ...
- 3 Load software ...
- 4 Set up software ...
- 5 Configure and Build kernel ...
- 6 Reboot kernel ...
- 7 All steps

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to previous menu, or q to quit: [All steps] ↵

1. Prepare physical disks

Run this step now? [yes] ↵

Physical disk(s) to prepare: [all] ↵

Bootstrap installed in existing partition on
sd(apsc(pci(1),f),0)

Physical disk sd(apsc(pci(1),f),0) prepared.

2. Prepare required virtual disks

Run this step now? [yes] ↵

Register all standard physical disks? [yes] ↵

Physical disk sd(apsc(pci(1),f),0) registered.

(short pause)

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
-none-	swap	150000	none	-	sd(apsc(pci(1),f),0)
/	root	70000	none	-	sd(apsc(pci(1),f),0)
/usr	usr	280000	none	-	sd(apsc(pci(1),f),0)

Modify this information? [no] ↵

Mounting /dev/dsk/root.

Mounting /dev/dsk/usr.

At this point, you may be asked if you want to create a virtual disk for halt dumps. If you do not have enough free space, or if you already have a virtual disk named dump, you will proceed directly to the section on loading the software.

No existing 'halt dump' disk found. Current free disk pieces (specified in blocks):

Physical Disk	Free Pieces
-----	-----
sd(apsc(pci(1),f),0)	1439703

Create a virtual disk for halt dumps? [yes] ↵

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
-none-	dump	-	Create	57000	sd(apsc(pci(1),f),0)

Modify this information? [no] ↵

For instructions when loading from remote media, see the discussion of identifying the remote file system as a DG/UX system software load device in Chapter 5.

Creating /dev/dsk/dump (57000 blocks) on
sd(apsc(pci(1),f),0).
Virtual disk "dump" created.
Virtual disk "dump" made a volume.
Making vdm_dumpsd(apsc(pci(1),f),0),dump) the default dump
device.

3. Load software

0:10 Run this step now? [yes] ↵

Type of release medium: [CD-ROM] ↵

(short pause)

DG/UX Operating System with X Window Systems Rn.nn of
 <Month/Year> from Data General Corporation
 Package Name(s): [development] ↵

You should not accept the default package suite if you did not create all recommended virtual disks. If you do so, the packages for which you did not create virtual disks will be loaded and set up in usr, which could overfill. If you do not want this to happen, answer ? to the Package Name(s): prompt and select packages individually from the list.

You selected the following packages:

[...selected packages display here...]

Correct? [yes] ↵

List file names while loading? [no] ↵

Answer kernel build questions before loading? [yes] ↵

System configuration identifier [aviion] **moe** ↵

[moe] Correct? [yes] ↵

You will be asked if you want to retain or modify the `system.device.name` and the `system.params.name` files. We recommend retaining your configuration parameters and customizing them later as needed.

Device configuration file: [retain] ↵

Parameter configuration file: [retain] ↵

Link the new kernel to /dgux? [yes] ↵

Save the old kernel? [yes]

We recommend you save your old kernel as a backup in case the new kernel doesn't boot. Selecting yes backs up the old kernel, `dgux.name`, into a file called `dgux.name.old`. You must have enough room in root to save the old kernel.

Operating system client? [no] ↵

Automatically reboot after building kernel? [yes] ↵

0:15 Checking for recommended file system mount points

(short pause)

Recommended File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Physical Disk
-----	-----	-----	-----	-----
/usr/opt/X11	usr_opt_X11	140000	None	sd(apsc(pci(1),f),0)
/usr/opt/networker	usr_opt_networker	50000	None	sd(apsc(pci(1),f),0)
/usr/opt/sdk	usr_opt_sdk	60000	Create	sd(apsc(pci(1),f),0)

Modify this information? [no] ↵

```
Mounting /dev/dsk/usr_opt_X11.
Mounting /dev/dsk/usr_opt_networker.
Creating /dev/dsk/usr_opt_sdk (60000 blocks) on
    sd(apsc(pci(1),f),0).
Virtual disk "usr_opt_sdk" created.
Virtual disk "usr_opt_sdk" made a volume.
Making file system on /e=dev/dsk/usr_opt_sdk.
Mounting /dev/dsk/usr_opt_sdk.

NOTE:  You may specify additional file systems which
        should be mounted during the installation.

Mount other file system(s)? [no] ↵
```



If you have an existing A&A database on a separate file system, mount it now.

```
0:20      Validating capacity of the mounted file systems
.....
.....
.....
```

If validation fails, see Appendix D.

NOTE: The installation utility will now start the package loading phase of the installation procedure. Once this phase begins, you cannot interrupt it.

0:30 Continue with the installation? [yes] ↵

NOTE: If the packages you have selected require setup (e.g. onc, tcpip, networker, etc.) then please wait until the next prompt appears. The delay may take up to 5 minutes depending on the number of packages you have chosen to load.

Loading DG/UX Operating System with X Window Systems Rn.nn of
<month/year> from Data General Corporation.

NOTE: To expedite the package loading and setup steps,
you can answer package setup questions in
advance of package loading by pressing Enter at
the prompt. If instead, you prefer to continue
the package loading and setup steps inter-
actively and at your own pace, type no before
you press Enter.

Do you want to answer, in advance, package setup questions
before package loading is complete? [yes] ↵

**If you choose to answer setup
questions now, use completed
planning worksheet 7 for the
prompts that follow.**

Is this system being set up as a node within a cluster?
[no] ↵

Configure system as a client for a remote NetWorker
server?[no] ↵

**If you answer “no” here, you need
to allocate space for backup index
and log files. If you answer “yes”,
you will proceed with entering
the NIS domain name.**

You now have the opportunity to create or adjust the size of
the /var/opt/networker file system. This file system is
needed to store the NetWorker online index and log files.
The default size of 10000 blocks is enough space to store
index information for multiple versions of several thousand
files--about enough for a small workstation with a single
disk drive. THIS IS NOT ENOUGH SPACE FOR A SERVER WITH
REMOTE CLIENTS! If your system has more than one disk drive,
or if it will be acting as a NetWorker server for remote
clients, you probably need to allocate additional space for
the online index.

/var/opt/networker File System:

File System	Virtual	Current	Action	Blocks	Physical
Mount Point	Disk	Blocks	Required	To Add	Disk
-----	-----	-----	-----	-----	-----
/var/opt/networker	var_opt_networker	10000	None	-	sd(apsc(pci(1),f),0)

Modify this information? [no] ↵

```
Mounting /dev/dsk/var_opt_networker.
/dev/dsk/var_opt_networker: File System is now mountable.
```

```
/dev/dsk/var_opt_networker: 1076 of 10000 blocks used (8924
free); 28 of 1726 inodes used (1698 free).
```

```
/dev/dsk/var_opt_networker: Time to fix
/dev/dsk/var_opt_networker was 2 seconds.
```

(short pause)

```
Enter the NIS Domain name: [worknet] ↵
[worknet] Correct? [yes] ↵
```

(short pause)

```
Do you want to keep the current values of your TCP/IP
parameters (e.g. primary host name, Internet address,
controller name?) [yes] ↵
```

0:45

```
Preparing to load the packages
.....
Loading package dgux
.....
Package dgux has been loaded.

Loading package networker .....
Package networker has been loaded.

Loading package nfs .....
Package nfs has been loaded.

Loading package onc .....
Package onc has been loaded.

Loading package sdk .....
Package sdk has been loaded.

Loading package sdk.X11 .....
Package sdk.X11 has been loaded.

Loading package tcpip .....
Package tcpip has been loaded.

Loading package X11 .....
Package X11 has been loaded.

Loading package dgux.man .....
Package dgux.man has been loaded.

Loading package networker.man ....
Package networker.man has been loaded.
```

```

Loading package nfs.man .....
Package nfs.man has been loaded.

Loading package onc.man .....
Package onc.man has been loaded.

Loading package sdk.man .....
Package sdk has been loaded.

Loading package sdk.X11.man .....
Package sdk.X11 has been loaded.

Loading package tcpip.man ....
Package tcpip.man has been loaded.

Loading package X11.man .....
Package X11.man has been loaded.

Package load is finished.
The selected packages have been loaded.

```

1:15

4. Set up software

Setting up dgux in usr.

```

    Initializing DG/UX /usr files ....
    Continuing setup of DG/UX ....

```

NOTE: See `srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux usr` for a detailed account of the usr setup of DG/UX.

Package dgux has been successfully set up in usr.
Setting up dgux in MY_HOST root.

```

    Setting up DG/UX .....
    Initializing DG/UX prototype files
    .....
    .
    .
    Creating DG/UX run level links
    .....

```

NOTE: See `srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.root` for a detailed account of the root setup of DG/UX.

Package dgux has been successfully set up in MY_HOST root.
Package setup for dgux is complete.

```
Setting up dg/ux.man in usr.
Setting up dgux.man man pages:...
```

```
Package dgux.man has been successfully set up in usr.
Package setup for dgux.man is complete.
```



**Security installers who have not
already set up security accounts
will assign passwords for security
accounts now.**

```
Setting up networker in usr.
Creating symbolic links ...
Package networker has been successfully set up in usr.
Setting up networker in MY_HOST root.
```

```
    Creating networker run level links.....
..Package networker has been successfully set up in MY_HOST
   root.
Package setup for networker is complete.
```

```
Setting up nfs in MY_HOST root.
Setting up NFS in MY_HOST root....
Creating NFS run level links.....
Initializing NFS prototype files.....
```

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/nfs.root
for a detailed account of the root setup of NFS.

```
...Package nfs has been successfully set up in MY_HOST root.
Package setup for nfs is complete.
```

```
Setting up nfs.man in usr.
Setting up nfs.man man pages:...
```

```
Package nfs.man has been successfully set up in usr.
Package setup for nfs.man is complete.
```

```
Setting up onc in MY_HOST root.
    Initializing ONC prototype files.....
    Creating ONC run level links.....
```

NOTE: This host will first run as an NIS client.

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/onc.root
for a detailed account of the root setup of ONC.

```
Package onc has been successfully set up in MY_HOST root.
Package setup for onc is complete.
```

```

Setting up onc.man in usr.
Setting up onc.man man pages:...

Package onc.man has been successfully set up in usr.
Package setup for onc.man is complete.

Setting up sdk in usr.
.....

Package sdk has been successfully set up in usr.
Package setup for sdk is complete.

Setting up sdk.man in usr.
Setting up sdk.man man pages:...

Package sdk.man has been successfully set up in usr.
Package setup for sdk.man is complete.

Setting up sdk.X11 in usr.
    Creating sdk.sde directories and links..
Package sdk.X11 has been successfully set up in usr.
Package setup for sdk.X11 is complete.

Setting up tcpip in usr.
    Setting up tcpip...

    NOTE:  The /usr/bin/rsh command now executes as a remote
           shell(remsh), not as a restricted shell(restsh).

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/tcpip.usr
file for a verbose description of the package setup for usr.

Package tcpip has been successfully set up in usr.
Setting up tcpip in MY_HOST root.
    Setting up tcpip ...
    Creating TCP/IP run level links ...

    NOTE:  See /var/setup.d/log/tcpip.root file for a
           verbose description of the package setup for root.

Package tcpip has been successfully set up in MY_HOST root.
Package setup for tcpip is complete.

Setting up tcpip.man in usr.
Setting up tcpip.man man pages:...

Package tcpip.man has been successfully set up in usr.
Package setup for tcpip.man is complete.

Setting up X11 in usr.
    Creating X11 directories and links.....
    Creating root and usr prototypes for X11.....
    Cleaning up the SDK area.
```

```
Package X11 has been successfully set up in usr.
Setting up X11 in MY_HOST root.
Package X11 has been successfully set up in MY_HOST root.
Package setup for X11 is complete.
```

```
Setting up X11.man in usr.
  Creating X11.man directories and links...
Setting up X11.man man pages.
```

```
Package X11.man has been successfully set up in usr.
Package setup for X11.man is complete.
```

1:30

5. Configure and build a kernel

```
Building kernel...
Successfully built dgux.moe.
Linked /dgux. You must reboot in order for this kernel to
take effect.
```

6. Reboot kernel

```
Booting sd(apsc(pci(1),f),0)root:/dgux -3
DG/UX System Release Rn.nn Bootstrap
Loading image
```

```
.....
DG/UX System Release Rn.nn, Version generic
Using 32 Megabytes of physical memory
Found 2 processors
Configuring devices .....
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file system.
Creating /dev ....
```

```
Checking local file systems .....
Mounting local file systems .....
Current date and time is <day month date time year> ...
```

```
Checking system files .....
Enabling automatically pushed STREAMS modules .....
Linking short names for /dev device nodes .....
Restoring TCP/IP tunable parameters
Loading terminal controllers ....
Starting disk daemons ....
Mounting local file systems .....
Checking for packages that have not been set up ....
Starting miscellaneous daemons ...
Starting STREAMS error logging daemon ....
```

```
Starting Logical Link Control Services ....
```

```
Attaching TCP/IP network interfaces .....
```

```
Starting system logging daemon ....
```

```
Starting NIS services as NIS client .....
```

```
Starting NFS lock services .....
```

```
Starting batch services ....
```

```
Starting line printer scheduler ....
```

```
Saving ex(1) and vi(1) temporary files ....
```

```
Starting NFS services .....
```

```
Starting TCP/IP daemons .....
```

```
Loading terminal controllers.....
```

```
Mounting NFS file systems .....
```

```
Starting DG/UX administrative services .....
```

```
Starting NetWorker server daemons .....
```

```
NOTE: The run level change is complete. See
       /etc/log/init.log for a verbose description of
       the system initialization process.
```

```
1:45 Press New Line to continue.
```

```
moe
```

```
DG/UX Operating System Rn.nn
```

```
Console Login:
```

Restoring files from tape

If you use the **dump2** command, you can use the **restore** command to replace any files that you may have overwritten during the system upgrade procedure. If you use the Data Backup Utility or Legato NetWorker to backup your system, refer to the product documentation for instructions on restoring file backups.

To restore files from tape, follow these steps:

- 1. Insert the backup tape in the tape drive, and close the drive door.**

2. Change to your /tmp directory and issue the restore command:

```
# cd /tmp ↵  
# /usr/sbin/restore if /dev/rmt/0 ↵
```

where:

- i** specifies interactive mode. You can search through the dump tape and look for files to restore. Because you are in the **/tmp** directory, you may restore any files you wish without fear of accidentally overwriting an existing file.
- f** specifies a nondefault archive name. In this example, **/dev/rmt/0** is the default.

3. At the restore> prompt, you can use the following commands:

- ls** List directory contents, or just filenames. (Do not use the **ls** options given in the **ls(1)** manual page.) Files that have been added to the extract list are marked with an asterisk (*).
- cd** Change directory. The **/** directory on the tape is the file system's mount point directory (the directory from which you made the backup). Make sure you specify a pathname relative to the top-level root directory when specifying the desired file system. For example, assume that your backup tape contains the **/usr** file system. Since **/usr** is the top-level root directory, you would use the command **cd /lib/acct** instead of **/usr/lib/acct** to change to the desired directory.
- pwd** Print working directory.
- add** Add filename to the list of files to be extracted.
- delete** Delete filename from the list of files to be extracted.
- extract** Extract requested files.
- quit** Exit program.
- help** Print list of files to be extracted.

For example, to restore the file **/etc/fstab**, change to the appropriate directory:

```
restore> cd /etc ↵
```


Verify that the file exists, and add it to the list to be extracted:

```
restore> ls filename ↵  
fstab
```

```
restore> add filename ↵
```

```
restore> ls filename ↵  
*fstab
```

Files to be extracted are preceded by an asterisk (*). Use the **extract** command to copy the file (*filename*) from tape to the **/tmp** directory on disk.

```
restore> extract ↵
```

You have not read any tapes yet. Unless you know which volume your file(s) are on, you should start with the last volume and work towards the first.

Specify next volume #: **1** ↵

Set owner/mode for '.'? [yn] **no** ↵

Answer **no** to the preceding prompt asking whether or not you want to copy the file system's mode (access permissions) from the root file system on tape to the file system in the **tmp** directory. After the file copies, you may then inspect the file and move it from the **/tmp** directory to the desired location.

Type **quit** at the restore prompt when finished.

```
restore> quit ↵
```

Where to go next

Go now to Chapter 7 to complete your upgrade installation.

End of Chapter

5

Installing or upgrading from remotely mounted release media

This chapter provides procedures for installing or upgrading your DG/UX system from a remotely mounted file system (disk or CD-ROM) containing the DG/UX system release.

This chapter includes the following major sections:

- Verifying the remote host resources
- Recording host information
- Mounting and exporting the release file system on the remote host
- Setting up the remote host to support the local host as an OS client
- Beginning the installation from a remote release medium
- Preparing physical and virtual disks
- Identifying the remote file system as DG/UX system software load device
- Cleaning up files after installation
- Where to go next

Figure 5-1 summarizes the steps for installing or upgrading your DG/UX system from remotely mounted release media.

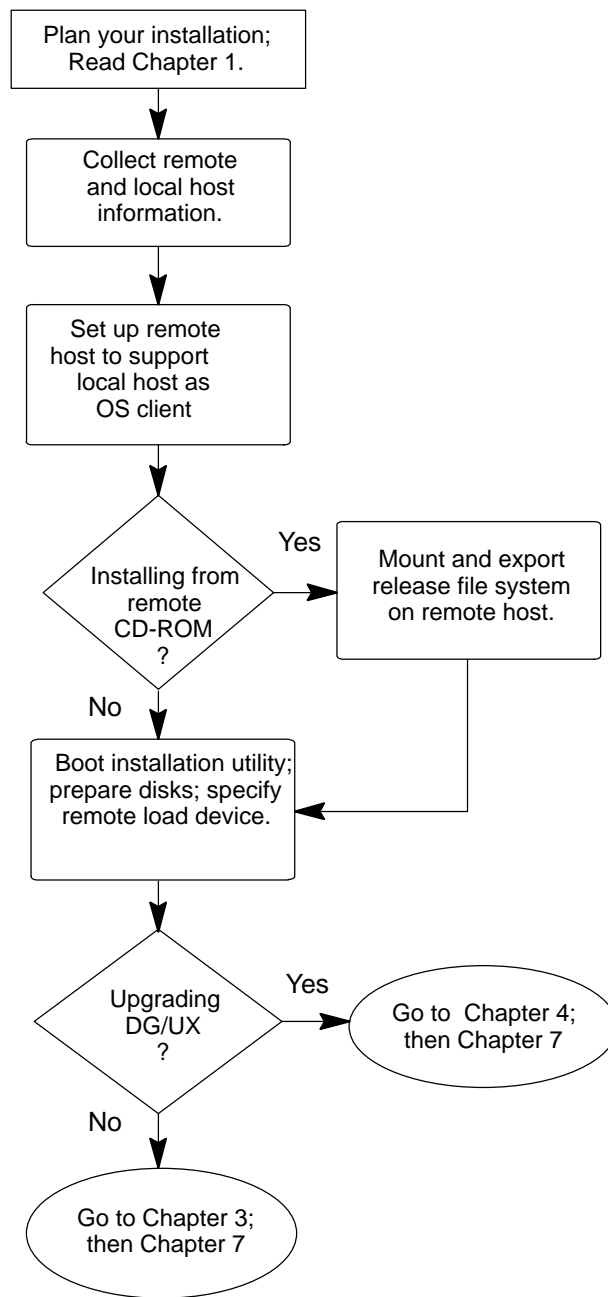


Figure 5-1 Installation procedure for remotely mounted media

IMPORTANT In this chapter, the computer exporting the remote file system is called the *remote host*. The system on which you are installing DG/UX system software is called the *local host*.

Verifying the remote host resources

Make sure the remote host meets these requirements:

- Runs the DG/UX R4.11 operating system or later, and the Bourne shell in particular.
- Is configured as a Network File System (NFS) server.
- Is connected to a local area network (LAN). The remote host and the local host must be on the same subnet.
- Has six megabytes of storage in its client root hierarchy (usually located at **/srv/release/PRIMARY/root/local-hostname**) to store the local host's root space temporarily.
- If the remote host uses the Network Information Service (NIS), the NIS package must be fully operational.

Recording host information

- **Supply configuration information for both the remote host and the local host. (Note that you duplicate some entries in Tables 5-1 and 5-2.)**

Table 5-1 Remote host information required for remote installation or upgrade

Item	Example	Actual
Local hostname	moe	
Internet address of local host	128.222.2.1	
Internet address of local host, in hexadecimal	80e00201	
Ethernet address of local host	8:0:1B:18:23:F7	
Pathname of remote file system	/release	

Table 5-2 Local host information required for remote installation or upgrade

Item	Example	Actual
Local hostname	moe	
Internet address of local host	128.222.2.1	
Subnetwork mask for this host	0xffffffff00	
Broadcast address for this host	128.222.2.255	
Remote hostname	alvin	
Internet address of remote host	128.222.2.3	
Pathname of remote file system	/release	

For help filling in the information in Tables 5-1 and 5-2, review the following subsections.

Hostname

You need to know the hostname for both the remote host and local host computers. A *hostname* is a unique name you assign to a computer. It is a unique combination of alphabetic characters and numbers. The period (.), hyphen (-), and comma (,) characters also are allowed. A hostname may comprise as many as 63 characters. Select a hostname that relates to the use or location of your system. Mnemonic names are particularly helpful in networked environments where hosts may share file systems. Do not use the names **MY_HOST** or **PRIMARY**; these names are reserved by the system.

If you are upgrading, use the **hostname** command at each host to determine the hostname for that machine.

Internet address

You need to know the Internet address for both the remote host and the local host.

For the local host only, you must also express its Internet address in hexadecimal format.

You can determine a host's Internet address using these methods:

- View the **/etc/hosts** file.
- Use the **ypcat** command:

```
% ypcat hosts | grep hostname ↵
```
- Use the **arp** command:

```
% arp hostname ↵
```

If you are performing a clean install, from any usable host you may execute an **awk** script that converts an Internet address from decimal to hexadecimal format. An example of such an **awk** script follows:

```
# echo 128.222.1.2 | awk -F. \
'{printf "%02X%02X%02X%02X\n", $1, $2, $3, $4}' ↵
80e00201
```

If upgrading, to find out the hexadecimal equivalent, type the **hostid** command at the local host. As an example, to find out the hexadecimal representation for your Internet address, you can type the following:

```
# hostid ↵
80e00201
```

Ethernet address

For the local host only, you need to know the Ethernet address. This is the host address that is unique to the particular hardware. The factory sets this address. It consists of six 2-digit (hexadecimal) fields separated by colons in the form *nn:nn:nn:nn:nn:nn*.

To determine a host's Ethernet address, watch the hardware powerup messages or refer to your hardware operating manual for instructions.

If you are upgrading, you can locate your host's Ethernet address by checking **/etc/ethers** either by viewing it or by using the **ypcat** command:

```
% ypcat ethers | grep hostname ↵
```

IMPORTANT The above method of locating the Ethernet address depends on your site administrator maintaining such information.

Network device

You need to know the network device name. This is the name of the device used to connect a computer to the LAN, such as **dpen0**.

IMPORTANT Installation from remote release media is supported only on systems that use Ethernet LAN controllers.

Subnetting network mask

For the local host only, you need to know the subnetting network mask. This is a hexadecimal bit pattern that specifies the number of bits used to identify the network designator within an Internet address. Examples of network masks are **0xff000000** and **0xffff0000**.

To find out the local host's subnet mask on any host on the subnet, use the **ifconfig** command and the name of the network device. An example follows:

```
% ifconfig dpen(pci(0),C,0) ↵
dpen(pci(0),C,0):128.222.2.1
flags=8443<UP,BROADCAST,RUNNING,STARTED>
        broadcast=128.222.2.255  netmask=0xffffffff00  metric=0
```

In this example, the subnet mask is **0xffffffff00**.

Broadcast address

For the local host only, you need to know the broadcast address. This is the Internet address used for all hosts on the network. An Internet address with a host portion that contains all ones (1) is reserved for BSD 4.3-compatible systems. A host portion that contains all zeros (0) is reserved for BSD 4.2-compatible systems.

To find out the local host's broadcast address on any host on the subnet, use the **ifconfig** command and the name of the network device. An example follows:

```
% ifconfig dpen(pci(0),C,0) ↵
dpen(pci(0),C,0): 128.222.2.1
flags=8443<UP,BROADCAST,RUNNING,STARTED>
        broadcast=128.222.2.255  netmask=0xffffffff00  metric=0
```

In this example, the broadcast address is **128.222.2.255**.

Pathname of remote host

Specify the pathname for the remote file system to be mounted. You need to know the pathname on the remote host that references the release area from which the remote load will occur.

Mounting and exporting the release file system on the remote host

IMPORTANT Perform these steps on the remote host only if you are installing from a remote CD-ROM device attached to that host.

- 1. Insert the release medium in the remote CD-ROM drive.**
- 2. Register the CD-ROM device so that the system can recognize the “+release” virtual disk, which contains the DG/UX software.**

An example follows. You may use either a command line or a **sysadm** operation.

Command:

```
# admpdisk -o register "sd(apsc(pci(1),f),5)" ↵
```

Sysadm path:

```
Device -> Disk -> Physical -> Register
```

- 3. Create a mount-point directory and /etc/fstab file entry for the file system on the remote host, and export the file system over NFS.**

You may choose an appropriate location to mount the file system. This example uses **/release**.

Command:

```
# admfilesystem -o add -f +release -p ro -e -x /release ↵
```

where **-f +release** identifies the virtual disk, **-e** exports the file system, **-x** mounts the file system, and **/release** names the mount point.

Sysadm:

```
File System -> Local Filesys -> Add
```

Take the default response for all prompts, except for the following prompts where you supply specific information. For example:

```
Virtual disk: +release ↵
Mount Directory: /release ↵
Exportable: yes ↵
```

Setting up the remote host to support the local host as an OS client

To set up the local host as an OS client, you can use the **sysadm** utility or enter commands to edit several files on the remote host. Steps in this section describe both methods.

Consult Table 5-2 when performing the following procedures.

1. Add the local host's Internet address and hostname to the **/etc/hosts** file.

Examples follow. You may either edit a file or perform a **sysadm** operation, whichever is preferable.

File Entry:

```
128.222.2.1    moe
```

Sysadm:

```
Networking -> TCP/IP -> Databases -> Hosts -> Add
```

When prompted, supply the local hostname and its Internet address.

```
Host name:    moe ↵
Internet address: 128.222.2.1 ↵
```

2. Add the local host's Ethernet address and hostname to the **/etc/ethers** file.

File Entry:

```
08:00:1B:03:45:11    moe
```

Sysadm:

```
Networking -> TCP/IP -> Databases -> Ethers -> Add
```

When prompted, supply the local hostname and its Ethernet address.

```
Host name:    moe ↵
Ethernet address: 08:00:1B:03:45:11 ↵
```

3. Copy the bootstrap file to **/tftpboot**, supplying the local host's Internet address in hexadecimal format.

If the hexadecimal form of the Internet address of the local host contains letters, you must enter those letters in uppercase form when naming the bootstrap file under the **/tftpboot** directory. Also, if any part of the hexadecimal address equals a single hexadecimal digit, you must add a leading 0 before that digit when constructing the bootstrap file name. For example, the four parts of the Internet address 128.222.2.1 translate into hexadecimal digits 80 E0 02 01.

An examples follows for a remote file system:

```
# cp /release/Rn.nn/0.boot.aviion /tftpboot/80E00201 ↵
```

where **0.boot.aviion** is the bootstrap file name, and **80E00201** is the Internet address (in hexadecimal) of the local host.

A message appears indicating that the bootstrap file was successfully read and written.

4. Create the local host's temporary root directory.

On DG/UX systems, the appropriate location is **/srv/release/PRIMARY/root**. Use the local host's name for the directory name. For example:

```
# cd /srv/release/PRIMARY/root ↵
# mkdir moe ↵
# cd moe ↵
```

5. Copy the standalone sysadm utility to the local host's root directory.

An example follows for a file system:

```
# cp /release/Rn.nn/3.standalone \
/srv/release/PRIMARY/root/moe/dgux ↵
```

6. Verify that the file dgux has been copied to the local host's root directory:

```
# cd /srv/release/PRIMARY/root/moe ↵
# ls dgux ↵
dgux
```

7. Edit the /etc/bootparams file to add an entry for the local host using the following format:

```
local-host<Tab>root=remote-host:local-host-root-pathname
```

Be sure to use a tab instead of spaces.

An example follows:

```
moe<Tab>root=simon:/srv/release/PRIMARY/root/moe
```

8. Edit the /etc/exports file to add the local host's pathname using the following format:

File Entry:

```
local-host-root-pathname <Tab> -access=local-host,
root=local-host
```

An example follows:

```
/srv/release/PRIMARY/root/moe -access=moe,root=moe
```

Sysadm:

File System -> Local Filesys -> Modify

Accept all defaults, with the following exceptions:

Exportable: **yes** ↵

Export options: **-access=moe,root=moe** ↵

9. Export the local host's directory listed in /etc/exports using the following command:

```
# exportfs -v /srv/release/PRIMARY/root/moe ↵
re-exported /srv/release/PRIMARY/root/moe
```

The message indicates that the directory was exported successfully.

10. Reinstall the remote host's ARP table as follows:

```
# initrarp ↵
```

```
ARP entry for moe (128.222.2.1) added to device cien0.
```

Now you have completed the procedures you must perform at the remote host.

Beginning the installation from remote release media

In this section you begin the installation process by booting the installation utility on the local host, using the local host's Ethernet LAN device as the boot device. Once you start the installation utility over the network and specify the remote drive for software loading, you return to the installation procedures in Chapter 3, or Chapter 4 if you are upgrading.

1. Boot the release medium by entering the appropriate boot command for booting over the network.

IMPORTANT Depending on your computer model, you may need to use a boot floppy. For more information, refer to the section on loading the installation utility on systems without an SCM in Chapter 3.

Worksheet 2

Consult your notice or completed **planning worksheet 2** in Appendix A for the name of your boot device.

For example:

```
SCM> b dpen(pci(0),C,0) ↵
```

Consult your notice for typical LAN boot device names. Your hardware operating manual also contains the device list for your computer model, and details on constructing an SCM LAN boot argument.

While the installation utility starts, a process that takes several minutes, messages similar to the following appear:

IMPORTANT Remember that the LAN device names and other messages will vary slightly depending on the type of media and the platform you are using.

```
Booting dpen(pci(0),C,0)
Local Ethernet address is 08:00:1B:18:23:F7
Local Internet address is 128.222.2.1, or 80e00201 hex
Broadcasting TFTP request
Server responding to broadcast: 128.222.2.3 or 80e00203 hex
DG/UX System Release Rn.nn Bootstrap
Booting network device dpen(pci(0),C,0)
Local Ethernet address is 08:00:1B:18:23:F7
Doing RARP
Local Internet address is 128.222.2.1, or 80e00201 hex
Broadcasting request for a boot server...
Host name: moe
Using alvin:/srv/release/PRIMARY/root/moe as root
Loading /dgux -> 3.standalone
Loading image .....
DG/UX System Release Rn.nn, Version Standalone sysadm
Using 32 Megabytes of physical memory
Found 2 processor(s)
Configuring devices .....
Registering disks ..
```

The installation utility automatically configures all standard devices attached to your system. A standard device is one that is recognized by the installation utility and the DG/UX system. Periods (.) written to the screen indicate that the utility is configuring your system's devices. The number of devices attached to your system determines the duration of the configuration process.

IMPORTANT A significant delay in the writing of periods to the screen means that the installation utility cannot locate all of the devices that are specified in the utility's built-in list of standard devices. Because your system is unlikely to include all standard devices, this delay is normal.

The initialization process continues as follows:

```
Running with no swap area.
Using memory resident file system
Creating /dev ....
```

```
INIT: SINGLE USER MODE
```

Periods (.) are written to the screen at regular intervals to indicate that the installation utility is loading.

After the installation utility has finished loading, **sysadm** displays the Standalone Sysadm Main Menu.

Standalone Sysadm Main Menu

```
1 Physical Disk    ->  Manage physical disks
2 Virtual Disk    ->  Manage virtual disks
3 File System     ->  Manage file systems
4 Install Software ->  Install system software
```

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to previous menu, or q to quit: [Install Software]:

2. Press Enter to begin the DG/UX software installation, as follows:

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to previous menu, or q to quit: [Install Software]: ↵

Install System Software Menu

```
1 Prepare physical disks
2 Prepare virtual disks
3 Load software
4 Set up software
5 Configure and Build kernel
6 Reboot kernel
7 All steps
```

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to previous menu, or q to quit: [All Steps]:

3. Press Enter again to select all steps necessary to install, as follows:

Enter a number, a name, ? or <number>? for help, <NL> to take the default, ^ to return to previous menu, or q to quit: [All Steps]: ↵

Preparing physical and virtual disks

Prepare the disks on the local host as described in Chapter 3. In most cases, you can accept the default response at system queries, as in most of the following examples:

1. Prepare physical disks

```
Run this step now? [yes] ↵
Physical disk(s) to prepare: [all] ↵
Bootstrap installed in existing partition on
sd(apsc(pci(1),f),0)
Physical disk sd(apsc(pci(1),f),0) prepared.
```

2. Prepare required virtual disks

```
Run this step now? [yes] ↵
Register all standard physical disks? [yes] ↵
```

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-none-	swap	50000	None	-	sd(apsc(pci(1),f),0)
/	root	40000	Expand	20000	sd(apsc(pci(1),f),0)
/usr	usr	240000	Expand	40000	sd(apsc(pci(1),f),0)

```
Modify this information? [no] ↵
```

Identifying the DG/UX system software load device

Now you are ready to load the software, and you must identify the remote file system as the DG/UX load device.

4. Press Enter to accept the default, and then type ? to list the types of release media and press enter again. For example:

3. Load software

```
Run this step now? [yes] ↵
Type of release medium: [Local tape device] ? ↵
```

1. CD-ROM
2. Local tape device
3. Remote tape device
4. Remote file system

5. Select 4 to identify the remote file system as the remote load device. For example:

```
Type of release medium: [Local tape device] 4 ↵
```

Note that you choose “Remote file system” even if you are using a CD-ROM release medium, because that the file system on the CD-ROM medium is mounted on the remote host.

6. Specify the network configuration information recorded in Table 5-2. Press Enter to accept the default response, or type ? for a list of choices. For example:

```
Network device to use on this host: [dpen(pci(0),C,0)] ↵
Name of this host: moe ↵
Internet address of this host: 128.222.2.1 ↵
Subnetting network mask used by this host: 0xffffffff ↵
Broadcast address used by this host: 128.222.2.255 ↵
Name of remote host: alvin ↵
Internet address of remote host: 128.222.2.3 ↵
```

7. Identify the operating system used by the remote host.

```
Operating system used by remote host [DG/UX]
```

Press Enter to accept the default, that the remote host is running DG/UX, as follows:

```
Operating system used by remote host [DG/UX] ↵
```

8. Specify the pathname for the file system on the remote system.

```
Pathname of release area on remote host: /release ↵
```

9. Proceed from here as if you were installing from local release medium.

- ▶ If you are installing any of the DG/UX products on a blank disk, proceed with the section on selecting the packages to load in Chapter 3. When you complete the installation procedures in Chapter 3, go to Chapter 7 to complete your installation, but remember to perform the cleanup steps listed below on the remote host.
- ▶ If you are upgrading, go to Chapter 4 and continue with the sample upgrade dialog. When you complete the installation procedures in Chapter 4, go to Chapter 7 to complete your installation, but remember to perform the cleanup steps listed below on the remote host.

Cleaning up files after installation

After you complete your installation or upgrade, remove the local host's entries from the remote host's environment as follows:

- Remove the local host's temporary root directory: for DG/UX systems, **/srv/release/PRIMARY/root/***local-hostname*.
- Remove the entry for the local host's temporary root directory from the **/etc/exports** file.
- Remove the bootstrap file from the **/tftpboot** directory.
- Remove the local host entry in the **/etc/bootparams** file.

Where to go next

Go now to Chapter 7 to complete your installation.

End of Chapter

6

Installing DG/UX in an alternate release area

This chapter describes how to perform a stand-aside software upgrade into an alternate release area. A *release area* is a collection of virtual disks and file systems that contain the operating system software. The chapter also explains how to set up a release area for this use and how to reboot the system from the alternate release area.

IMPORTANT See your notice for release and patch requirements for running stand-aside upgrade procedures.

Stand-aside upgrade overview

With a stand-aside upgrade, you can load and set up new system software and build a new kernel for the new software while the DG/UX system is running and user services are available. This capability reduces your system upgrade downtime to the time it takes you to shutdown and reboot the system. Also, if you load a new release in an alternate release area and then encounter problems running that new release, the previous release is still intact and can be rebooted to restore user services.

Stand-aside upgrade procedures require that a system have at least two defined release areas. By default, the DG/UX system installs into a release area called PRIMARY, which consists of links to the currently running / and /usr file systems. However, once you set up an alternate release area on the system and can perform stand-aside upgrades, PRIMARY becomes an alias that always refers to the currently booted release area.

After you set up an alternate release area, you can install a release of the DG/UX system in that space. The stand-aside upgrade procedures load and set up the software updates. Then, to run the newly-installed DG/UX release, you build a new kernel specifying the alternate release area name and reboot the system using the kernel associated with the updated release area.

For detailed information about the implementation of stand-aside procedures, see the **admrelease(1M)** and **admclient(1M)** man pages. We recommend that you study these man pages before performing the work explained in this chapter.

General steps in a stand-aside upgrade

If you want to install a new DG/UX upgrade with minimal downtime and minimal user service disruption, you can create an alternate release area and install the upgrade in that release area with these general steps:

- Create a new separate **srv** virtual disk and file system that can be shared among all release areas you create.
 - Name the PRIMARY release area (for example, A) and generate a release area definition based on that source release area. Assigning a new name to that release area frees the name PRIMARY for use by the system as an alias for whichever release area contains the booted active release. The release area definition based on the PRIMARY release area is used by the system in later operations to duplicate the structure and contents of that running release area.
 - Create an alternate release area (for example, B) and create the client (for example, the host harpo) in the alternate release area. Creating the new release area and client creates the new empty virtual disks and mounts the file systems needed to duplicate the source release area. This step in effect prepares the new release area into which you will copy the source release area's contents and the software upgrade.
 - Copy the **usr** and client file systems from the source release area (A) to the alternate release area (B). The copy creates a mirror image of the running operating system and its associated data at the time that the copy is made.
-
- Load and set up the software upgrade in the alternate release area.
 - Build a new kernel in the alternate release area.
 - Boot the system using the new kernel in the alternate release area. This action starts the DG/UX release installed in the alternate release area, making that alternate release area active and the source release area idle.

In the context of stand-aside upgrades, a *client* is a system as it is while running a DG/UX release installed in one of its release areas. For example, assume that a single physical host machine named harpo can be a client of either of two release areas set up on its physical disks. If the two release areas contain different DG/UX releases, then the harpo that is a client of the first release area differs from the harpo that is a client of the second area — the DG/UX releases in the release areas are different, therefore the characteristics and capabilities of harpo will differ depending on the booted release.

Figure 6–1 illustrates the upgrade of a DG/UX system using a stand-aside upgrade into an alternate release area B on a system named harpo.

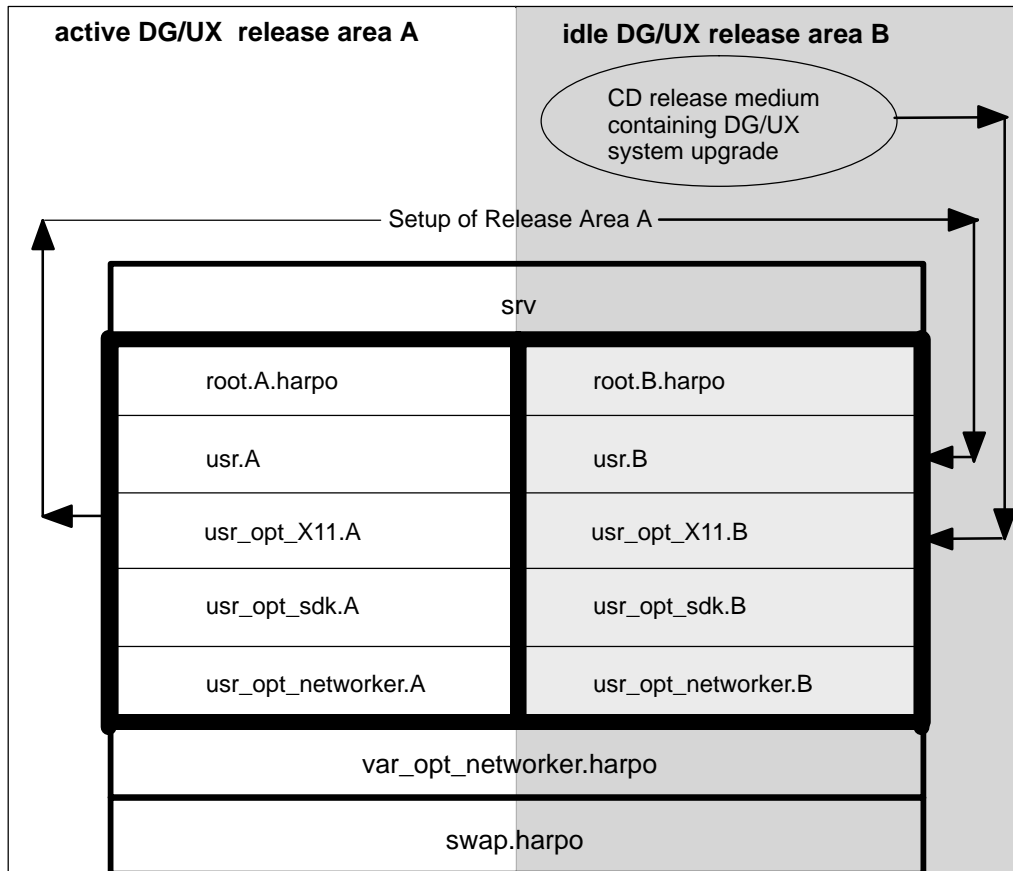


Figure 6–1 Stand-aside upgrade example

In Figure 6–1, A is the active or source release area booted and running on your system. It contains the DG/UX release you use to create the alternate release. B is the idle or alternate release area that you create. Conceptually, the system harpo looks like this after you finish setting up the alternate release area as explained in this chapter. Note that the **root** and **usr** virtual disks are duplicated, one per release area, while the virtual disks **srv**, **var_opt_networker.harpo**, and **swap.harpo** are not duplicated but are accessible from and used by all releases set up on the system.

Unless you need to maintain several bootable DG/UX versions on one system, two release areas are all you need to minimize the downtime you lose to upgrades. To continue the example, you can install the next upgrade from release area B to release area A, the next from A to B, and so on. The re-use of two release areas for stand-aside installations is illustrated by Figure 6-2.

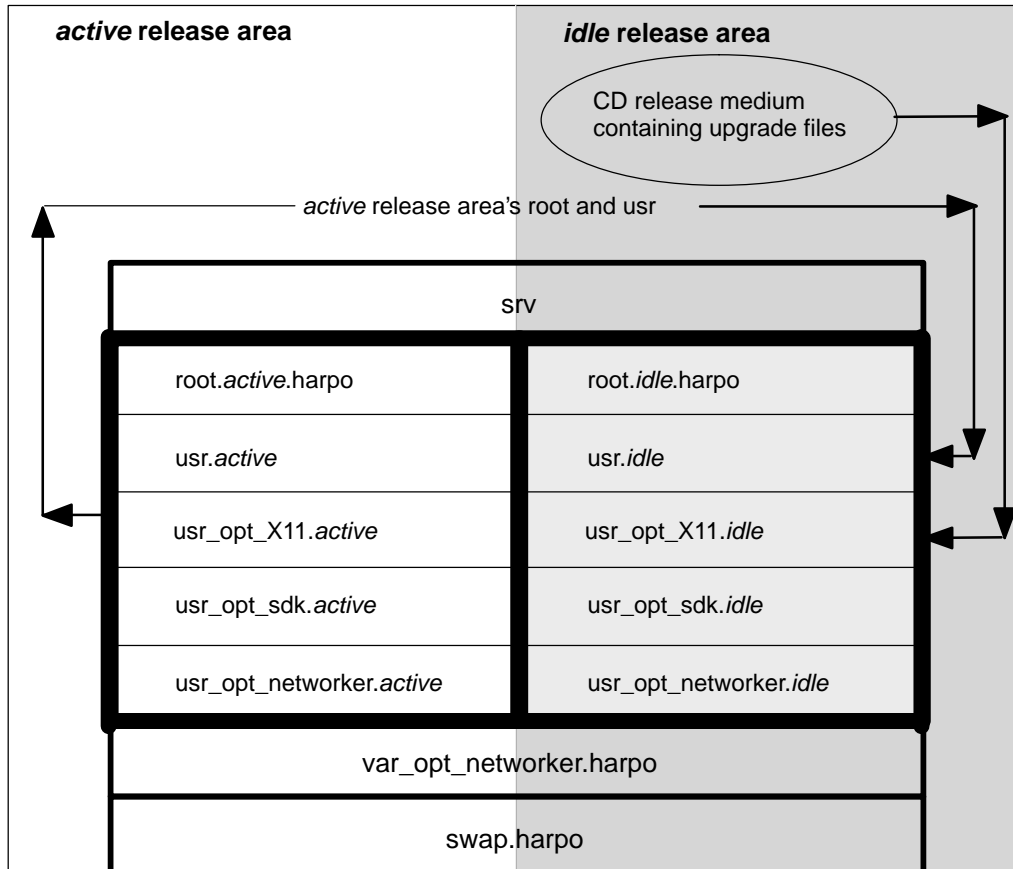


Figure 6-2 Re-use of two release areas for ongoing stand-aside upgrades

In Figure 6-2, *active* is any release area containing the DG/UX release currently booted and running on your system, *idle* is any inactive alternate release area that you created, and harpo is the system on which the release areas are set up. Again, note that the virtual disks **srv**, **var_opt_networker.harpo**, and **swap.harpo** are not duplicated but are accessible from and used by all releases set up on the system.

Naming conventions for OS-related virtual disks

Some **adm** commands and the DG/UX installation and upgrade processes require that operating system (OS) virtual disk names follow specific conventions. However, you need not and should not change the names of virtual disks manually when setting up and using alternate release areas. The commands and processes themselves modify virtual disk names as needed in the course of their normal execution. This section explains these naming conventions.

The names used for operating system-related virtual disks vary depending on:

- Whether or not the contents of the virtual disk depend on a particular DG/UX release.
- Whether or not the contents of the virtual disk should be available to a client regardless of release.

Naming conventions for shared virtual disks

Operating system virtual disks shared by all clients of a release area have an **FS_USR** frequency designation in any release area definition you generate. The names of these virtual disks follow this naming convention:

disk_name.release_area_name

These virtual disk names have two components: a disk name for the particular virtual disk and the name of the release area explicitly associated with the virtual disk. For example:

usr.A

usr_opt_X11.B

However, if the content of the virtual disk does not depend on a particular release area in which a specific release of the DG/UX system is installed, the virtual disk has an **FS_SRV** or **VD_SRV** frequency designation in the release area definition and the *release_area_name* portion is not included in its name. For example:

srv

Naming conventions for host-specific virtual disks

Operating system virtual disks used by only one client of a release area and replicated for each additional client have an **FS_ROOT** frequency designation in any release area definition you generate. The names of these virtual disks follow this naming convention:

disk_name.release_area_name.host

These virtual disk names have three components: a disk name for the particular virtual disk, the name of the release area explicitly associated with the virtual disk, and the name of the single host that is the client of the disk. For example:

root.A.harpo

However, if the content of the virtual disk does not depend on a particular release area in which a specific release of the DG/UX system is installed, the virtual disk has an **FS_CLIENT** or **VD_CLIENT** frequency designation in the release area definition and the *release_area_name* portion is not included in its name. For example:

dump.harpo

File system frequency

File system frequency is one of the characteristics of a virtual disk that controls how the disk is created and named when you replicate it in an alternate release area. A frequency value for each virtual disk appears in the release area definition you create in the process of creating the alternate release area. To see the frequency value in the context of other information stored about a virtual disk, see step 11 of “Preparing to duplicate the original release area.” Table 6–1 lists and briefly defines file system frequencies.

Table 6–1 File system frequency values

Value	Description
FS_ROOT	One file system per client per release area.
FS_USR	One file system per release area.
FS_CLIENT	One file system per client.
FS_SRV	One file system per system, mounted under <i>/srv/release/release#root/hostname</i> .
FS_SRV_USR	One file system per system, mounted under <i>/srv/release/release#usr</i> .
VD_CLIENT	One raw virtual disk per client.
VD_SRV	One raw virtual disk per system.

For more information about file system frequency, see the **admrelease(1M)** man page.

Preparing to duplicate the original release area

IMPORTANT This work needs to be done only once on a system.

To prepare a system for stand-aside upgrades, you:

- Create a new separate **srv** virtual disk and file system that can be shared among all release areas you create.
- Name the PRIMARY release area. Assigning a new name to the PRIMARY release area frees the name PRIMARY for use by the system as an alias for whichever release area contains the booted active release.
- Generate a release area definition based on the source PRIMARY release area. This release area definition is used by the system in later operations to duplicate the structure and contents of that running release area.

In the examples accompanying the steps, harpo is the host system and A is the active or source release area that contains the DG/UX release booted and running on system harpo.

1. Create a new separate virtual disk and file system for **/srv**:

```
# admvdisk -o create -n 20000 srv
Virtual disk "srv" created.
Virtual disk "srv" made a volume.

# admfilesystem -o create srv
Warning: This operation will destroy all information on
/dev/dsk/srv. Do you wish to continue? [no] y
File system created on virtual disk /dev/dsk/srv.

# admfilesystem -o add -f /dev/dsk/srv /srv
File system added: /srv
```

These operations can also be performed through the **sysadm** paths Device -> Disk -> Virtual -> Create, File System -> Local Filesys -> Create, and File System -> Local Filesys -> Add.

The **/srv** file system is the storage location for information about release areas and clients. Although this area is created by default as part of a stand-alone DG/UX installation, the default area is associated only with the installed release and cannot be shared with another release. When you create this new **srv** virtual disk and its **/srv** file system, you create an **srv** area independent of any specific release area. Its information can then be shared among all release areas you create.

2. Find out which file systems are mounted under the existing **/srv** mount point associated with the active release:

```
# mount | grep "/srv/"
/dev/dsk/srv_dump on /srv/dump type dg/ux (rw)
```

3. Unmount the file systems returned by the **grep** command you ran in step 2:

```
# umount /srv/dump
```

After you complete the unmounts, additional file systems mounted under the running system's **/srv** file system are no longer mounted or available. This leaves only the actual **/srv** contents available under the **/srv** file system.

4. Make a new temporary mount point (directory) and then mount the new **/srv** area you created, **/dev/dsk/srv**, on the new directory:

```
# mkdir /mnt
# mount /dev/dsk/srv /mnt
```

This operation gives you access to the new **/srv** file system through the mount point **/mnt**.

5. Make your current directory the running release's **/srv**, then copy everything from that directory into the new **/srv** file system mounted on the temporary **/mnt** directory:

```
# cd /srv
# find . -mount -depth -print | cpio -pdmuv /mnt
```

6. Mount the new file system on the **/srv** mount point:

```
# cd /
# umount /mnt
# mount /srv
```

These operations unmount the new **/srv** file system from its temporary mount point **/mnt** and mount it back on its permanent mount point, **/srv**.

7. Mount the file systems you unmounted in step 3:

```
# mount /srv/dump
```

Mounting the file systems on the newly-mounted shared **/srv** file system makes these additional file systems available.

8. Ensure that your system is running at run level 3 (multi-user mode).

9. Modify the PRIMARY release area definition to control which file systems are included in or excluded from the definition of the named area.

- a. Exclude a file system if you do not want it included in the release area definition and renamed when you generate the definition. For example, you may choose to exclude site-specific file systems that you created and mounted on or in **/usr**, **/tmp**, **/var**, or **/opt**. To exclude a file system, you do one of two things:
 - Set a non-default frequency for the file system that you do not want duplicated. For example, to set a non-default frequency for a NetWorker file system installed in **/var/opt**, you can enter:

```
# admrelease -o set -O FS_SRV -m 10000:/var/opt/networker \
PRIMARY
```

- Unmount the file system that you do not want duplicated. Typically, you unmount any file system in **/usr/opt** and **/opt**, other than those containing packages delivered the DG/UX system, that you want to share between release areas instead of copying them for each new release area.

- b. Include a non-default file system you want in the release area definition with a form of the command:

```
# admrelease -o set -O frequency -m size:mount_point PRIMARY
```

For example, suppose you have the Data General Mxdb debugger product installed in the file system **/usr/opt/mxdb**. To include that file system in the release area definition so that every release area uses it, you enter a command like the following:

```
# admrelease -o set -O FS_SRV_USR -m 25000:/var/opt/mxdb \
PRIMARY
```

IMPORTANT To remove an entry you added to the release area definition, enter a form of the command:

```
admrelease -o set -O frequency -m none:mount_point \
existing_release_area
```

For example, to remove the entry for the file system **/var/opt/networker**, you enter:

```
# admrelease -o set -O FS_SRV -m none:/var/opt/networker \
PRIMARY
```

10. Assign a new name to the PRIMARY release area, and generate a release area definition based on the source release in the PRIMARY release area:

```
# admrelease -o name_primary -O rename_vdisks A
```

```

Copying PRIMARY release database to A.
Defining 280000 block /usr in A DB.
Defining 50000 block /usr/opt/sdk in A DB.
Defining 40000 block /usr/opt/networker in A DB.
Defining 95000 block /usr/opt/X11 in A DB.
Defining 80000 block / in A DB.
Defining 10000 block /var/opt/networker in A DB.
Defining 20000 block /srv in A DB.
Defining 100000 block swap in A DB.
Updating OS server harpo's fstab in A release area.
Copying PRIMARY client harpo databases to A.

```

```

Note: Attempting to rename misnamed file systems (virtual
      disk names that do not match the naming conventions).
      The /etc/fstab and /etc/mntttab files will also be
      modified to reflect the new name.
Renaming virtual disk root to root.A.harpo
Virtual disk "root" renamed to "root.A.harpo"
Modifying fstab to mount /dev/dsk/root.A.harpo at /
File system modified: /
Renaming virtual disk var_opt_networker to
      var_opt_networker.harpo
Virtual disk "var_opt_networker" renamed to
      "var_opt_networker.harpo"
Modifying fstab to mount /dev/dsk/var_opt_networker.harpo at
      /var/opt/networker
File system modified: /var/opt/networker
Renaming virtual disk usr to usr.A
Virtual disk "usr" renamed to "usr.A"
Modifying fstab to mount /dev/dsk/usr.A at /usr
File system modified: /usr
Renaming virtual disk usr_opt_sdk to usr_opt_sdk.A
Virtual disk "usr_opt_sdk" renamed to "usr_opt_sdk.A"
Modifying fstab to mount /dev/dsk/usr_opt_sdk.A at
      /usr/opt/sdk
File system modified: /usr/opt/sdk
Renaming virtual disk usr_opt_networker to
      usr_opt_networker.A
Virtual disk "usr_opt_networker" renamed to
      "usr_opt_networker.A"
Modifying fstab to mount /dev/dsk/usr_opt_networker.A at
      /usr/opt/networker
File system modified: /usr/opt/networker
Renaming virtual disk usr_opt_X11 to usr_opt_X11.A
Virtual disk "usr_opt_X11" renamed to "usr_opt_X11.A"
Modifying fstab to mount /dev/dsk/usr_opt_X11.A at
      /usr/opt/X11
File system modified: /usr/opt/X11

```

Note: Attempting to rename misnamed virtual disks (disks with names that do not match the naming conventions).
 Renaming virtual disk swap to swap.harpo
 Virtual disk "swap" renamed to "swap.harpo"
 Modifying fstab for /dev/dsk/swap.harpo swap_area

This operation creates a release area definition called A based on the file systems currently mounted on /, **/usr**, and **/tmp**, and on or in **/var**, **/opt**, and **/usr/opt**. The **-o name_primary** option renames the PRIMARY release area to A and frees the name PRIMARY for use by the system to point to whichever release area contains the booted and active release. The **-O rename_vdisks** option renames any of the original PRIMARY virtual disks that do not conform to the naming conventions required by the **admrelease** and **admclient** commands.

11. Compare the definition of release area A to the actual release A to ensure that they contain the same virtual disks and mount points:

```
# admrelease -o check -O defined -f short -U -c harpo A
```

The **check** operation compares the definition of the source release area to the actual content of that area. The definition must include all of the virtual disks and mount points in the source release area with the proper frequency. See Table 6-1 for a summary of frequency values and how to interpret them.

Conditions where the definition and the actual release area contents do not agree will produce diagnostic output lines explaining the cause of the problem.

Errors reported by this operation must be resolved before you continue. Use the information in the diagnostic output to resolve the problem and then run the **check** operation again to confirm your fixes. Potential problems and their fixes are:

- A virtual disk exists in the release area definition but not in the source release area: Use the **admvdisk** command to verify this problem and, if needed, create or rename the disk.
- A file system is part of the release area definition but is not mounted in the source release area: Use the **mount** command to mount the file system.
- A mount point exists in the release area definition but is not part of the source release area: Use the **ls** command to verify this problem. If needed, use the **mkdir** command to create the mount point and then use the **mount** command to mount the file system for that mount point.

- A file system is defined as an **nfs** type in the release area definition but is mounted as a **dg/ux** type in the source release area, or as **dg/ux** when it should be **nfs**: Verify this problem by checking the file system entry in the **/etc/fstab** file and, if necessary, change the type.

If you need to adjust the release area definition, you can use the **admrelease -o set -m size:mntpt -O frequency A** command. Table 6-1 shows a summary of file system creation frequency values and what they mean.

Recommended file system sizes change from release to release. As a consequence, you may need to use the **admrelease** command to adjust the sizes of file systems in the release area definition. For the minimum required file system sizes, see your notice.

12. Set boot defaults on the boot disk, specifying the new default root and swap names:

```
# admpdisk -o set_defaults -r root.A.harpo -s swap.harpo \
'bootdisk device-spec'
```

Creating an alternate release area with one client

IMPORTANT You do the following operations only once for each alternate release area you create. If you have an idle release area available that you want to use for a stand-aside upgrade, skip this section and continue with “Upgrading software in an alternate release area” in this chapter.

To create a second or alternate release area, you copy the active release area’s definition to the idle release area definition. The operation also creates new **usr** virtual disks and file systems for the alternate release area and mounts them under the **/srv/release** tree. This results in an exact duplicate of the source release area, with the same number of file systems mounted at the same mount points.

This baseline system in the new release area allows you to load the upgrade into the release area, eliminating the need for a clean installation into the area. You then add the host machine as a client to the alternate release area to create the client-specific virtual disks and file systems required for correct system installation and operation.

In the examples accompanying the steps, harpo is the host system, A is the active or source release area that contains the DG/UX release booted and running on system harpo, and B is the idle or alternate release area.

1. Verify that the definition of the source release area matches the source release area, using the instructions in step 11 of “Preparing to duplicate the original release area.” If you just performed this comparison, you need not do it again.
2. If your system requires special virtual disk placement, striping, or software mirroring of file systems with **FS_USR** frequency, create the virtual disks with the required naming conventions now. Subsequent commands that operate on these virtual disks will use existing virtual disks that you create at this time.
3. Create the new release area B using release area A as the source. This operation creates the required virtual disks and file systems for the **FS_USR** frequency file systems if they do not exist.

```
# admrelease -o create -S A -v B
Copied A release databases to B
Making virtual disks as defined for B .
  Create virtual disk usr.B on sd(apsc(pci(1),D,0,7),0,0)
  Create file system on usr.B
  Create virtual disk usr_opt_sdk.B on sd(apsc(pci(1),D,0,7),0,0)
  Create file system on usr_opt_sdk.B
  Create virtual disk usr_opt_networker.B on sd(apsc(pci(1),D,0,7),0,0)
  Create file system on usr_opt_networker.B
  Create virtual disk usr_opt_X11.B on sd(apsc(pci(1),D,0,7),0,0)
  Create file system on usr_opt_X11.B
Updating OS server harpo's fstab in A release area.
  Add /srv/release/B/usr to fstab.
  Add /srv/release/B/usr/opt/X11 to fstab.
  Add /srv/release/B/usr/opt/networker to fstab.
  Add /srv/release/B/usr/opt/sdk to fstab.
```

Release B has been added. You may now load software into this release area using the Package management operations.

4. If your system requires special virtual disk placement, striping, or software mirroring for file systems with **FS_ROOT**, **FS_CLIENT**, and **VD_CLIENT** frequency, create the virtual disks with the required naming conventions now. Subsequent commands that operate on these virtual disks will use existing virtual disks that you create at this time.
5. Create a client **harpo** in the new release area B:

```
# admclient -o add -C -O noproto -r B harpo

Making virtual disks as defined for B harpo.
  Create virtual disk root.B.harpo on sd(apsc(pci(1),D,0,7),0,0)
  Create file system on root.B.harpo
  Use existing virtual disk tmp.harpo on sd(apsc(pci(1),D,0,7),0,0)
  Use existing virtual disk var.harpo on sd(apsc(pci(1),D,0,7),0,0)
```

```

Use existing virtual disk var_opt_networker.harpo on
sd(apsc(pci(1),D,0,7),0,0)
Use existing virtual disk swap.harpo on sd(apsc(pci(1),D,0,7),0,0)
Updating OS server harpo's fstab in A release area.
Add /srv/release/B/root/harpo to fstab.
Add /srv/release/B/root/harpo/tmp to fstab.
Add /srv/release/B/root/harpo/var to fstab.
Add /srv/release/B/root/harpo/var/opt/networker to fstab.
Client harpo has been added.
Correcting /srv/release/B harpo fstab.
Add /srv/release/B/root/harpo nfs entry in B harpo fstab.
Correct B harpo fstab: root.B.harpo /
Add /srv/release/B/root/harpo/tmp nfs entry in B harpo fstab.
Correct B harpo fstab: tmp.harpo /tmp
Add /srv/release/B/root/harpo/var nfs entry in B harpo fstab.
Correct B harpo fstab: var.harpo /var
Add /srv/release/B/root/harpo/var/opt/networker nfs entry in B harpo
fstab.
Correct B harpo fstab: var_opt_networker.harpo /var/opt/networker
Correct B harpo fstab: swap.harpo swap_area
Correct B harpo fstab: srv /srv
Add /srv/release/B/usr nfs entry in B harpo fstab.
Correct B harpo fstab: usr.B /usr
Add /srv/release/B/usr/opt/sdk nfs entry in B harpo fstab.
Correct B harpo fstab: usr_opt_sdk.B /usr/opt/sdk
Add /srv/release/B/usr/opt/networker nfs entry in B harpo fstab.
Correct B harpo fstab: usr_opt_networker.B /usr/opt/networker
Add /srv/release/B/usr/opt/X11 nfs entry in B harpo fstab.
Correct B harpo fstab: usr_opt_X11.B /usr/opt/X11
Making /srv/release/B harpo mount points.

```

This **admclient** command creates virtual disks and file systems for file systems with **FS_ROOT**, **FS_CLIENT**, and **VD_CLIENT** frequency and mounts the file systems under **/srv/release/B/root/harpo**. The **-O noproto** option prevents the new client from being populated with data from the release area's **root.proto** — you populate the new client from the running client later.

Upgrading software in an alternate release area

After you set up an alternate release area, you can use the running and active DG/UX system to perform a stand-aside upgrade in that release area. You first copy the existing **usr** and **root** data into the inactive release area, then perform a stand-aside upgrade to load and set up the software updates for the DG/UX system and applications included with the DG/UX system.

IMPORTANT Once you begin this process, you should complete the remaining upgrade steps within a short period of time. You also should not do system administration work in the active or source release area once the upgrade is started, because changes you make to the active release area are not propagated automatically to the idle or target release area.

In the examples accompanying the steps, harpo is the host system, A is the active or source release area that contains the DG/UX release booted and running on system harpo, and B is the idle or alternate release area.

1. Verify that the release area definitions match the actual release areas:

```
#admrelease -o check -O defined -f short -U -c harpo A
#ddmrelease -o check -O defined -f short -U -c harpo B
```

2. Copy the **usr** portion of the release area from A to B:

```
# admrelease -o copy -S A -U B
Do you really want to copy files A into B
```

If you answer **no**, the operation stops here. If you answer **yes**, the operation copies the contents of A into B:

IMPORTANT To reduce space consumption, the **admrelease(1M)** **copy** operation preserves existing holes in files and creates new holes in files that contain blocks of zeroes. “Holes” are regions of unallocated disk blocks that replace zero-filled blocks; they are commonly found in **ndbm(3c)** files, for example. If you require zero-filled blocks to remain intact in certain files, use the **-o noholes** option on the **admrelease -o copy** command line. For more information, refer to the **admrelease(1M)** on-line manual page.

```
Continue [no] yes
Copy A USR file systems to B
Copy ./usr from A to B.
    Copied 1443370 blocks.
Copy ./usr/opt/sdk from A to B.
    Copied 339000 blocks.
Copy ./usr/opt/networker from A to B.
    Copied 212900 blocks.
Copy ./usr/opt/X11 from A to B.
    Copied 704190 blocks.
```

3. Copy the **root** data for the host machine **harpo** from A to B. The **-O nosetup** option inhibits copying setup scripts from the source client so that you avoid re-running all setup scripts:

```
# admrelease -o copy -S A -c harpo -O nosetup B
Do you really want to copy files A into B
```

If you answer **no**, the operation stops here. If you answer **yes**, the operation copies the contents of A into B:

```
Continue [no] yes
Copy A ROOT file systems for harpo to B
Copy ./ from A to B.
    Copied 446440 blocks.
Correcting etc files for harpo in release area B.
Correct etc/exports file.
Correct fstab file.
Recopying root.proto from /srv/release/B/usr to B.
    Copied 0 blocks.
```

At this point, the alternate release area, B, is equivalent to the source release area, A.

4. If you want to load the upgrade from a CD-ROM, make the disk and its contents available to the system with the following commands:
 - a. `# admpdisk -o register 'CD-ROM_device_spec'`
Physical disk *CD-ROM_device_spec* registered.
 - b. `# mkdir /cdrom`
 - c. `mount -rv /dev/dsk/+release /cdrom`
/dev/dsk/+release mounted on */cdrom*
5. Load the software updates for the packages and package suites required on your system into the alternate release area, using the **sysadm** Software → Package → Load operation and specifying these values for the prompts:

```
Release Area: [PRIMARY] B↵ Enter the name of your idle
                             alternate release area.

Release Medium: [/cdrom] ↵ Select the /cdrom default to
                             load from a CD-ROM.
```

6. Set up software in the alternate release area using the **sysadm** Software → Package → Set up operation and specifying these values for the prompts::

```
Release Area: [PRIMARY] B↵ Enter the name of your
                             alternate release area.

Client(s) to set up: [none] ?↵
    Enter the name of the clients you want to set up,
    or enter ? to list available clients and select
    the ones you want to set up.
```

If you need help answering the setup questions, refer to Chapter 3.

7. If you loaded the software updates from a CD-ROM, unmount the file system on the disk and release the CD-ROM device:
 - a. `# umount /cdrom`
 - b. `# admpdisk -o deregister 'CD-ROM_device-spec'`
Physical disk `CD-ROM_device-spec` deregistered.
 - c. Remove the CD-ROM disk from the CD-ROM drive.
8. If you want to load additional software updates, repeat steps 4 through 7.

Building a kernel for an alternate release area

Before you can run a newly-installed upgrade in an alternate release area, you must build a new kernel, specifying the idle release area name when you perform the build. You use this new kernel to reboot the system with the new upgrade in the updated release area.

For example, to build a new kernel for a new release area B for client **harpo**, you enter this command:

```
# admkernel -o configure -X -c harpo -R B harpo
```

You enter your hostname in place of the first **harpo** in each line, and your kernel configuration filename in place of the last **harpo** in each line.

Installing a new bootstrap

You must install a new bootstrap on a machine after performing a stand-aside upgrade on it, because the upgrade does not update the bootstrap automatically. The new bootstrap includes new machine support and device definitions implemented in the upgrade.

IMPORTANT To proceed with the following instructions, you need to know if your machine has an SCM. To find out whether or not your computer model has an SCM, see your notice.

1. To install a new bootstrap on machines *have* an SCM, enter:

```
# admnvram -o set -f /dev/scm \  
'bootstrap_4=/srv/release/B/usr/stand/boot.pc/boot4'  
# admnvram -o set -f /dev/scm \  
'bootstrap_5=/srv/release/B/usr/stand/boot.pc/boot5'
```

2. To install a new bootstrap on machines that *do not have* an SCM, enter:

```
# admpdisk -o install -b /srv/release/B/usr/stand/boot.pc device-spec
```

3. After installing the bootstrap, set boot defaults on the boot disk, specifying the default root and swap virtual disk names for the new release area B:

```
# admpdisk -o set_defaults -r root.B.harpo -s swap.harpo \
bootdisk_device-spec
```

Instead of using the **admpdisk** command to install a new bootstrap before booting from the alternate release area, you can first boot from the alternate release area and then use the **sysadm** Device -> Disk -> Physical -> Soft Format -> Install Bootstrap operation to install the new bootstrap. However, if you want to install new hardware devices that are supported only by the software upgrade, you should use the **admpdisk** command to install the bootstrap before rebooting.

On systems that have an SCM, you can also install the new bootstrap with the **sysadm** System -> NvRAM -> Install Bootstraps menu.

Booting the kernel in an alternate release area

After you build the kernel for the alternate release area, you must shutdown the system and boot that new kernel to begin running the DG/UX release installed in the alternate release area.

The release area you boot is dictated by which root is booted and mounted by the kernel. The booted root is defined by the **-r** option setting you enter in a boot command line or by the default root marked (with the **admpdisk -o set_defaults** command) on the physical disk you specify as part of the boot command. If you mark the default root on the physical disk with the **admpdisk** command, you need not specify a root to boot with the **-r** option in the boot command line.

1. Shut down the system normally using the **shutdown** command.
2. If your machine supports SCM, enter a boot command similar to the following at the SCM prompt:

```
SCM>b sd(npvc(cpci(0),2),0) root.B.harpo -r root.B.harpo -i 3
```

The example boots the DG/UX system to run level 3 on a host named harpo from an alternate release area named B.

3. If your machine does not support SCM, enter a boot command similar to the following at the machine's boot command prompt:

```
Boot Command:sd(apsc(pci(0),0) root.B.harpo -r root.B.harpo \
-i 3
```

The example boots the DG/UX system to run level 3 on a host named harpo from an alternate release area named B.

4. The system boots and runs the DG/UX release installed in alternate release area B, making release area B the active release area and rendering inactive the release area containing the previously running DG/UX release.

Upgrading an existing alternate release area

To install a DG/UX upgrade in an existing alternate release area, you perform these steps explained in this chapter:

1. Copy and load the software in the release area using instructions in "Upgrading software in an alternate release area."
2. Build a new kernel for the release area using instructions in "Building a kernel for an alternate release area."
3. Boot the new kernel to start running the DG/UX system upgrade in the alternate release area using instructions in "Booting the kernel in an alternate release area."

End of Chapter

7

Completing your installation

This chapter helps you complete your installation of the DG/UX system. It contains the following major sections:

- Logging in on a generic DG/UX system
- Logging in on a DG/UX security system
- Assigning passwords to **sysadm** and **root**
- Post-installation tasks
- Where to go next

Logging in on a generic DG/UX system

When the DG/UX system finishes booting, a login prompt appears. Congratulations! You have successfully installed your DG/UX system.

The login prompt you see depends on whether your system console is a graphics monitor or a nongraphical display terminal. Proceed to the section below appropriate to your system.

Logging in using a graphics monitor

If you are using a graphics monitor, you are working in an X Windows graphical interface environment. You will see a console login prompt similar to the following for several seconds before the login screen appears:

```
DG/UX System Release n.nn  
Console login:
```

IMPORTANT Do not log in at the console login prompt. Within moments it is replaced by the login screen shown in Figure 7-1.

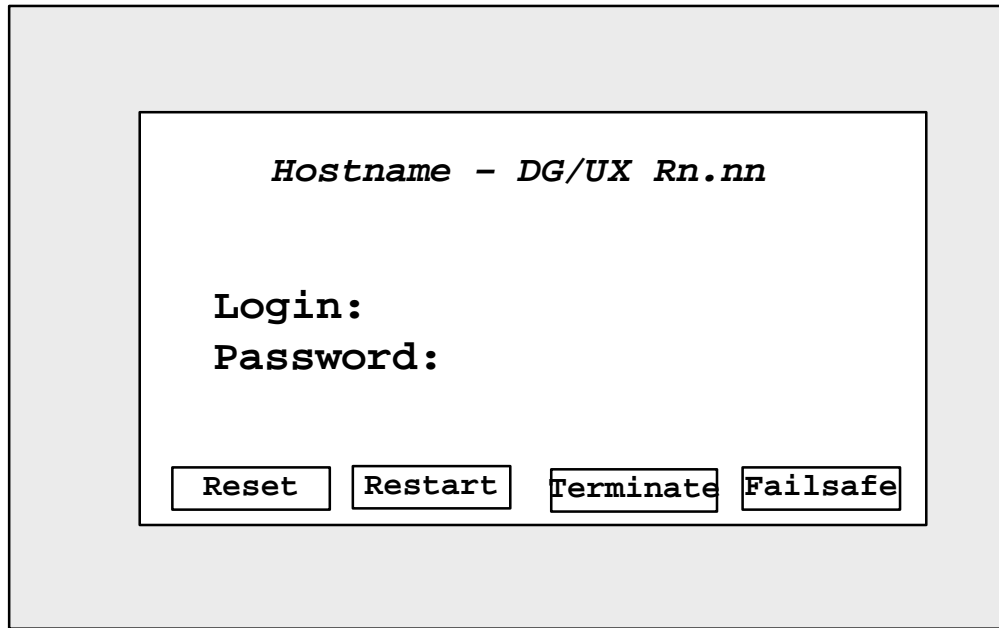


Figure 7-1 Login screen for a graphics monitor

1. At the login prompt, type **sysadm** and press Enter.

IMPORTANT If necessary, use the mouse to move the root pointer (the large X symbol on your screen) inside the login window.

2. At the password prompt, press Enter.

A password for **sysadm** is not required at this time.

This action clears the screen and displays two X clients:

xterm	VT100 terminal emulator
-------	-------------------------

session log	Icon which represents an output-only display of error messages produced from the startup of the X Window System
-------------	---

Logging in as **sysadm** gives you the appropriate privileges required to use the system administration (**sysadm**) utilities. These utilities provide a menu-driven set of system administration procedures that you use to customize your system. The final section of this chapter that tells you where to go next, lists the customization tasks you will or may need to perform to make your system fully operational.

For information on customizing the X Window graphical environment, refer to *Using the DG/UX® System*. For detailed information on working in the X environment, see the *X Window System User's Guide: OSF/Motif Edition*.

Exiting the X Window Environment

To exit the X Window environment and continue working in a single VT100 terminal emulator environment, do the following:

1. Move the root pointer to the **Terminate** button in the login window and click the left mouse button.

A single window appears.

2. Press and hold Enter after about 10 seconds to display the console login prompt.

```
DG/UX System Release n.nn  
Console login:
```

3. Log in by typing **sysadm**, and press Enter.

The superuser (#) prompt appears:

```
#
```

4. To return to the X Window system environment, log out by typing **exit** and pressing Enter, and then log in again by typing **xadm** and pressing Enter. No password is required.

Logging in using a nongraphical display terminal

If your system console is a nongraphical display terminal, you are working in a VT100 terminal emulator interface environment. A console login prompt similar to the following appears:

```
DG/UX System Release n.nn  
Console login:
```

- Log in by typing **sysadm**, and press Enter.

The superuser prompt (#) appears. Logging in as **sysadm** gives you the superuser privileges required to use the system administration (**sysadm**) utilities. These utilities provide a menu-driven set of system administration procedures that you use to customize your system.

Logging in on a DG/UX security system



When the DG/UX B2 or C2 system finishes booting, the login prompt appears. The login prompt you see depends on whether the system console is a nongraphical display terminal or a graphics monitor. At this point, you can log in to create new users or customize your security installation.

This section describes how to log on initially as **sysuser**. We recommend that you log in initially as **sysuser** to gain initial access to the system.

If you overloaded or upgraded an existing B2 or C2 security installation, the user accounts you created and customizations you made on that installation were retained during the upgrade. If you already have other administrator accounts set up for use on the system, you can use these accounts to perform administrative tasks and will have no need to log in using the default **sysuser** account.

For instructions on logging in to your system, proceed to the appropriate section.

Logging in using a nongraphical display terminal

If your system console is an alphanumeric terminal, a console login prompt similar to the following appears:

```
DG/UX [B2|C2] Security Option Release n.nn  
Console login:
```

► To gain initial access to the system:

1. **Log in as sysuser.**
2. **At the password prompt, enter the local password you specified earlier for sysuser.**

This action clears the screen and presents a shell prompt (\$).

On C2 systems, you can now add users and customize the system.

On B2 systems, you have limited access to the DG/UX security system as **sysuser**. Before you can add users or continue setting up the security environment, you must assume the **sysadmin** role.

► To assume the sysadmin role to perform system administration tasks:

1. **Assume the sysadmin role by entering:**

```
$ assume sysadmin ↵
```

2. At the password prompt, enter the assume password you specified earlier for sysadmin.

In the **sysadmin** role, you can start and use **sysadm**, a menu-driven set of system administration procedures, to add users and customize the security environment. To start **sysadm**, enter this command at the command line prompt:

```
# sysadm ↵
```

See *Managing Security on the DG/UX® System* for instructions on adding new users and customizing the DG/UX security system.

Logging in using a graphics monitor

For instructions on logging in to your security installation using a graphics monitor and graphical interface, see the notice that came with your security product.

Assigning passwords to sysadm and root

IMPORTANT This section does not apply to the DG/UX information security products. See *Managing Security on the DG/UX® System* for information about login accounts and passwords on DG/UX security systems.

It is important to secure your system immediately to prevent unauthorized access. Two login names have been established for installation and system management tasks: **sysadm** and **root**. The **sysadm** name normally is reserved for the system administrator, who customarily installs the DG/UX system and performs system administration duties. The **root** name is reserved for the superuser, who can access all files and perform privileged system calls.

To adhere to naming conventions, a password:

- Cannot be the same as the login name.
- Must have at least six characters.
- Must contain at least two uppercase or lowercase alphabetic characters (a–z and A–Z).
- Must contain at least one numeric or special character, such as ?, !, @, \$, 0 through 9, or a space.
- Cannot be a circular shift of the login name (for example, the login name **anemone** cannot be transcribed as the password **nemonea**).

Examples of valid passwords are **\$99down**, **2nafish**, **!opr8r**, and **man2man**.

Select a password you won't forget, such as a name or word that is meaningful to you alone, following these steps:

1. Logged in as **sysadm**, at the shell prompt (**#**), type **passwd** and press Enter.

2. In response to the following prompt:

```
Changing password for sysadm
New password:
```

type the password you have chosen and press Enter. (To help maintain security, your password does not appear on the screen as you type it.)

3. To confirm the new password, at the prompt:

```
Re-enter new password:
```

retype your new password and press Enter. After the system verifies your new password, the shell prompt (**#**) appears.

4. While logged in as **sysadm**, you can assign a password to **root** by entering:

```
# passwd root ↵
```

and answering the prompts. Likewise, you can assign a password to **sysadm** when logged in as **root** by entering:

```
# passwd sysadm ↵
```

You may repeat steps 1 through 3 to assign a password to **root**.

For more information on passwords, see the **passwd** manual page.

Post-installation tasks

After you complete your installation or upgrade, you should perform all of the following tasks that apply to your situation:

- Removing and storing the release medium.
- Documenting the configuration.
- Setting up the DG/UX documentation CD-ROM.
- Running In-Service Diagnostics software.
- Formatting disks other than the system disk.
- Installing boot strings on a hard disk.
- Reconstructing the file system structure
- Adding a third-party operating system.
- Configuring tunable parameters.
- Reinitializing NvRAM parameters on high-end AViiONs
- Powering up and configuring WORM devices.
- Registering read-only devices in compatibility mode.
- Adding nonstandard devices.
- Adding nonstandard packages.
- Restoring a dual-initiator configuration.
- Freeing up allocated disk space.

The following subsections explain these tasks.



IMPORTANT If you installed a DG/UX security system, check the security manuals for security-specific information relevant to the tasks described in this section.

Removing and storing the release medium

After you finish installation and are successfully logged in, remove the DG/UX release medium from the drive and store it safely.

IMPORTANT To remove CD-ROM medium from a drive, you must first deregister the device. You can use the Device -> Disk -> Physical -> Deregister **sysadm** operation. Refer to *Managing Mass Storage Devices and DG/UX® File Systems* for detailed instructions.

Documenting the configuration

After you build and boot your kernel, you may want to document the configuration by printing a list of configured devices and the system file.

You can use the **sysdef** command to extract from the kernel a list of configured devices, pseudo devices, network protocols, streams modules and values of all tunable parameters. The command format follows:

```
sysdef kernel-file | nl | pr -h "header"
```

where:

sysdef is a command that generates configuration information from the specified *kernel-file*.

nl is a line-numbering filter.

pr is a command that prints the contents of a file; **-h** designates an enquoted *header*.

An example follows:

```
# sysdef /dgux.monarch | nl | pr -h "Production Kernel for  
monarch" ↵
```

Setting up the DG/UX documentation CD-ROM

Most of your DG/UX manuals come on the documentation CD-ROM. You can view the contents of the CD-ROM on a PC running Microsoft Windows or Windows NT.

The DG/UX documentation CD-ROM includes DG/UX manuals and software for viewing the manuals on-line. For instructions on setting up the software and viewing the on-line manuals, see the documentation provided with the CD-ROM.

Running In-Service Diagnostics software

We strongly urge you to run the default In-Service Diagnostics (ISD) test session immediately after loading (installing or upgrading) the DG/UX system software on your computer system. If the test session reports any problems (either in the error log, or displayed on the console screen), please contact Data General immediately.

For more information on the default ISD test session, refer to the hardware manual, *Using AViiON[®] Diagnostics and the AV/Alert Diagnostic Support System — DG/UX[®] Environment*.

Formatting disks other than the system disk

If you have other disks in addition to the system disk, you should format them and create the necessary virtual disks and file systems on them now. Refer to *Managing Mass Storage Devices and DG/UX® File Systems* for how to format and create virtual disks and file systems.

Installing boot strings on a hard disk

After you install the DG/UX system software, you can use either the **sysadm** utility or the **admnvram** command to set the primary default boot command string in the NvRAM database (Non-volatile RAM DataBase) to boot from a network controller.

Before you can write to the NvRAM database, you must initialize it. You need perform this operation only once after soft-formatting the disk. Examples of the **sysadm** operations and the **admnvram** commands follow.

***CAUTION** Initializing the NvRAM database will destroy parameters previously set on this physical disk with the **admnvram** command.*

From the **sysadm** utility, use the following menu paths:

```
System -> NvRAM -> Initialize Database
System -> NvRAM -> Set Parameter
```

From the shell prompt, use the following **admnvram** commands:

```
admnvram -o initialize -f 'sd(apsc(pci(1),D),0)' -p
admnvram -o set -f 'sd(apsc(pci(1),D),0)' -p \
boot_command_1='sd(apsc(pci(1),D),0) root -f /dgux -1 3'
```

IMPORTANT You can set up to nine boot commands in the NvRAM database. The system will attempt to boot from them in order until one succeeds; if none succeeds, you will receive the Boot command: **prompt**.

For more information, refer to the **admnvram(1)** and **boot(8)** man pages.

Reinitializing NvRAM parameters on high-end AViiONs

Some high-end AViiON machines, such as the AV 20000 and AV25000, come with 3D Boards that contain nonvolatile random access memory (NvRAM) parameters. The **admnvram** command treats each of these AViiON machines as a system with an SCM for the purpose of parameter storage and retrieval. If you are upgrading from DG/UX R4.20, which contains NvRAM parameters on disk, you must reinitialize each of the necessary NvRAM parameters as stated below:

boot_command_[1-3]	Must be reinitialized if used.
boot_command_[4-9]	Not supported.
clock_offset	Must be reinitialized if used.
serial_number	Read-only, supplied by the 3D Board hardware.
boot_timeout	Fixed at 15 seconds; cannot be read or written.
keyboard_language	Read-only, U.S. English (USen), the only keyboard language supported by AV 20000 machines.

Reconstructing the file system structure

If you want to reconstruct your previous file system structure and need more information about how to do it, refer to *Managing Mass Storage Devices and DG/UX® File Systems*.

Adding a third-party operating system

We recommend that users install other operating systems before installing the DG/UX system. In the case of a preloaded system, however, the DG/UX software is already on the primary disk, so you must remove it temporarily to install other operating systems you want to use on that disk. A third-party operating system is most useful on the primary disk so you can boot it on system reset.

To install a third-party operating system on a computer that already has DG/UX software installed, you must temporarily move all of the preinstalled DG/UX file systems to a secondary disk. After installing the other operating system, move the DG/UX software back onto the primary disk. This will allow you to boot DG/UX and the other operating system from the primary disk.

Use the following procedure to install a third-party operating system on your machine after the DG/UX system is on the primary disk. Make sure you have a full backup of your files before you begin.

1. Boot DG/UX standalone sysadm. (Standalone **sysadm** should configure both the primary and the secondary disks.)

2. Determine which scenario applies to your secondary disk and follow the instructions.

- ▶ If the secondary disk is at least as large as the primary disk, then do a physical disk copy from the primary disk to the secondary disk. Be sure this secondary disk is *not* registered. For example:

```
Physical Disk -> Copy
```

When the physical disk copy is complete, go to **step 6**.

- ▶ If the secondary disk is not as large as the primary disk, be sure that it's large enough to hold all of the DG/UX file systems.

You must be able to move the virtual disks containing the DG/UX file systems individually from the primary disk to the secondary disk. Continue with the next step.

3. Prepare the secondary physical disk to hold the virtual disks currently on the primary physical disk. Perform the following tasks if necessary.

- ▶ Initialize the secondary disk to hold virtual disks using the following **sysadm** path:

```
Physical Disk -> Soft Format -> Perform All
```

CAUTION *If you create a new virtual disk information table on a disk, existing virtual disks on that physical disk will be lost.*

The Perform All operation performs each step in order: labeling the physical disk, creating the new virtual disk information table, establishing bad block mapping facilities, and installing a bootstrap program. You can also elect to perform the steps individually and may omit any step you want.

In the following example, we do not allow the operation to create the virtual disk information table because we do not want to completely reformat the physical disk.

```
Enter a number, a name, ? or ,number>? for help, <NL>
to redisplay menu, ^ to return to previous menu, or q
to quit: 5↵
```

```
Physical Disk(s): sd(apsc(pci(1),f),1)
Install Disk Label? [yes] ↵
Create Virtual Disk Information Table? [yes] no↵
Establish Bad Block Mapping Facilities? [yes] ↵
Install Bootstrap? [yes] ↵
Size of Bad Block Remap Area (blocks): [100] ↵
Disk type: generic↵
Label installed on sd(apsc(pci(1),f),1)
Physical disk sd(apsc(pci(1),f),1) registered.
Bootstrap installed in existing partition on
sd(apsc(pci(1),f),1).
Bad block mapping established on physical disk
sd(apsc(pci(1),f),1).
```

- Register the secondary disk using the following **sysadm** path:

```
Physical Disk -> Register
```

- 4. Using slightly different names, create the virtual disk partitions on the secondary disk to hold the file systems currently on the primary disk using the following sysadm path:**

```
Virtual Disk -> Create
```

For example, you might create a virtual disk named **root_temp** to hold the **root** file system that resides on the primary disk. You would perform the same step for **usr**, **usr_opt_networker**, and all other file systems on the primary disk.

It is necessary to create these disk partitions on the secondary disk before you can actually move the virtual disks.

IMPORTANT Virtual disks created on the secondary physical disk must be the same size as the file system they intend to hold (for example, **root_temp** should be the same size as **root**).

It is not necessary to move the **swap** and **dump** virtual disks as they do not contain persistent data. They will be recreated on the primary disk later.

- 5. Move the virtual disks from the primary disk to the secondary disk (e.g., source root to the destination root_temp) using the following sysadm menu path:**

```
Virtual Disk -> Move
```

After a virtual disk move, the destination virtual disk assumes the name of the source virtual disk, and the source virtual disk disappears. In other words, **root_temp** will no longer exist and **root** will reside on the secondary disk.

Perform this virtual disk move for **root**, **usr**, **usr_opt_networker** and all other file systems on the primary disk.

When all of the DG/UX file systems are located on the secondary disk, you are ready to prepare the primary disk for installation of the third-party operating system.

6. Deregister the primary disk using the following sysadm menu path:

Physical Disk -> Deregister

7. Remove the DGUX_vdm PC partitions on the primary disk using the following sysadm menu path:

Physical Disk -> PC Partitions -> Departition

After you complete this step, there will be no PC partitions located on the primary disk.

8. Halt standalone sysadm:

Enter a number a name, ? or ,number.? for help, <NL> to redisplay the menu, or q to quit: **q** ↵

9. Install the third-party operating system following the installation instructions that come with the third-party software.

IMPORTANT Be sure not to allow the third-party software to occupy the entire primary disk (consult the third-party documentation for how to do this).

10. After the third-party software is installed, use the SCM or the boot floppy that shipped with your system to boot the DG/UX standalone sysadm from the secondary disk.

Remember to use the device specification for the secondary disk in the boot path.

11. Prepare the primary physical disk to receive the DG/UX virtual disks (currently on the secondary disk). Use the following sysadm menu path:

Physical Disk -> Soft Format -> Perform All

This initializes the primary disk, installs bootstraps, installs bad block remapping, and registers the primary disk.

12. If you used a physical disk copy (see step 2), remove the swap and dump virtual disks on the secondary physical disk using the following sysadm menu path:

Virtual Disk -> Remove

13. Recreate the swap and dump virtual disks on the primary physical disk using the following sysadm menu path:

Virtual Disk -> create

14. Using slightly different names, create the virtual disk partitions on the primary disk to hold the DG/UX file systems currently on the secondary disk using the following sysadm menu path:

Virtual Disk -> create

For example, you could use the name **root_temp**, this time to hold the **root** file system that currently resides on the secondary physical disk. You would perform this step for **root**, **usr**, **usr_opt_networker**, and all other DG/UX file systems on the secondary physical disk.

IMPORTANT Virtual disks created on the primary physical disk must be the same size as the file system they intend to hold (for example, **root_temp** should be the same size as **root**).

It is necessary to create these disk partitions on the primary physical disk before you can actually move the DG/UX virtual disks back to the primary disk from the secondary disk. Also note that it is not necessary to move the swap and dump virtual disks as you should have recreated them in **step 13**.

IMPORTANT Depending on the amount of disk space used by the third-party operating system on the primary physical disk, all the DG/UX file systems may not fit again on the the primary disk. If this is the case, move what can be moved, starting with **root** and **usr**, and leave the remaining file systems on the secondary disk.

15. Move the DG/UX virtual disks from the secondary disk to the primary disk (e.g, source **root** to the destination **root_temp**) using the following sysadm menu path:

Virtual Disk -> Move

After a virtual disk move, the destination virtual disk assumes the name of the source virtual disk, and the source virtual disk disappears. In other words, **root_temp** will no longer exist and **root** will reside on the primary disk.

Perform this virtual disk move for **root**, **usr**, **usr_opt_networker** and as many other DG/UX file systems located on the secondary disk as you can fit on the primary disk.

Some or all of the DG/UX file systems should now be located on the primary physical disk along with the third-party operating system.

16. Reboot the DG/UX system.

After the DG/UX system reboots, you may want to escape to the shell (entering “!” at any prompt), and use the **admnvram** command to set up a default boot path in the non-volatile RAM database on the primary physical disk.

Configuring tunable parameters

Chapter 4 explains how to edit the components of the system configuration file to restore kernel customizations from the kernel backup file. If you need more information on configuring and rebuilding a kernel, refer to *Managing the DG/UX® System*.

You configure tunable parameters by adding the necessary parameters to the **system.params.name** file, and then rebuilding and rebooting the kernel. The section on restoring kernel customizations in Chapter 4 explains how to add data to the **system.params.name** file.

Powering up and configuring WORM devices

After completing an upgrade or overload, you need to add any WORM devices you have to the system configuration. You turn on the power to WORM devices and configure them in the kernel.

Chapter 4 explains how to retain and add new kernel customizations. You can easily add devices to the kernel by using the **sysadm** operation System → Kernel → Config and Build. This allows you to edit the device configuration file to include a WORM device and then rebuild your kernel.

For additional information on configuring and rebuilding a kernel, refer to *Managing the DG/UX® System*.

Adding nonstandard devices

If you have nonstandard devices connected to your machine, you will need to configure these devices and rebuild your DG/UX kernel.

A *standard device* is one you purchased from Data General for use with AViiON computers. Its device ID has been preset through a jumper or a DIP switch setting at the factory. The installation process automatically configures standard devices.

The **/usr/etc/probedevtab** file lists the names of all standard devices. A device that isn't listed in **/usr/etc/probedevtab** is nonstandard.

You configure nonstandard devices by adding the necessary device names to the **system.device.name** file, and then rebuilding and rebooting the kernel. The section on restoring kernel customizations in Chapter 4 explains how to add data to the **system.device.name** file. For more information on configuring nonstandard devices and kernel building, refer to *Managing Mass Storage Devices and DG/UX[®] File Systems* and *Managing the DG/UX[®] System*.

IMPORTANT A standard device becomes nonstandard if you rejunper it to a nonstandard address. For information on determining the controller addresses, refer to *Programming in the DG/UX[®] Kernel Environment*.

If you try to add a device purchased from a third-party vendor, it may be recognized by the DG/UX system, but there are no guarantees. The device may not be compatible with the device driver provided by Data General. In this event, you will have to write a compatible device driver to accommodate the device. For details, see *Writing a Standard Device Driver for the DG/UX[®] System*.

Adding nonstandard packages

A *standard package* is one that is included on the DG/UX medium or whose notice explicitly states that it conforms to DG/UX software package standards. All other packages are considered *nonstandard*.

If you have a nonstandard software application, you need to know if it writes to the system file. For example, Netware, OSI/P, PICK, SNA, and X.25 all put parameters in the system file. The notice for the software application should provide you with the necessary information.

To run these applications, you can either add the customizations to the new DG/UX configuration files as described in the section on restoring kernel customizations in Chapter 4, or you can choose not to configure and build your kernel at this time. For more information on the latter, refer to the notice for the product.

Restoring a dual-initiator configuration

For dual-initiator configurations such as those supported by the DG/UX Cluster Software product in which two or more host computers share a single SCSI bus, you may need to edit the system file and build a new kernel after the upgrade is complete. See the DG/UX Cluster Software documentation for more information.

Chapter 4 explains how to edit the components of the system configuration file to restore kernel customizations from the kernel backup file. If you need more information on configuring and rebuilding a kernel, refer to *Managing the DG/UX® System*.

Freeing up allocated disk space

If you do not plan to include the system in a DG/UX cluster, you can reclaim system space by deleting the directory tree **/usr/root.proto**. Use this command:

```
# rm -rf /usr/root.proto ↵
```

IMPORTANT Do not delete **/usr/root.proto** if you plan to install the DG/UX Cluster Software product. The DG/UX Cluster option needs that directory tree to install the operating system on the second and subsequent nodes and to distribute software packages throughout the cluster.

Where to go next

Before your DG/UX system is fully operational, you may need to perform some or all of the tasks listed in Table 7-1. You may perform some of these tasks immediately following installation; you perform others over the lifetime of your DG/UX system.

Many of the tasks in the table refer you to manuals provided on the DG/UX documentation CD-ROM that came with your order. For how to set up the viewing software and access the on-line manuals, see the documentation provided with the CD-ROM. The printed versions of these manuals are also available for purchase from Data General.



If you installed one of the DG/UX security products, refer to the security manuals included with your order as the primary source of information for performing the tasks.

Table 7-1 Additional installation information

For this task	Refer to this manual
Documenting your system configuration.	<i>Preventing and Fixing Problems on the DG/UX[®] System</i>
Activating or verifying AV/Alert service.	<i>Using AViiON[®] Diagnostics and the AV/AlerSM Diagnostic Support System — DG/UX[®] Environment</i>
Adding users	<i>Managing the DG/UX[®] System Security; Managing Security on the DG/UX[®] System</i>
Addressing performance problems	<i>Preventing and Fixing Problems on the DG/UX[®] System</i>
Configuring CLARiiON storage systems.	<i>Planning a CLARiiON[®] Disk-Array Storage System Installation—DG/UX[®] Environment and Installing and Maintaining a CLARiiON[®] Disk-Array Storage System</i>
Configuring and managing disk and tape drives.	<i>Managing Mass Storage Devices and DG/UX[®] File Systems</i>
Configuring printers.	<i>Installing and Managing Printers on the DG/UX[®] System</i>
Configuring modems.	<i>Managing Modems and UUCP on the DG/UX[®] System</i>
Configuring other standard devices.	<i>Managing the DG/UX[®] System</i>
Configuring nonstandard devices.	<i>Managing Mass Storage Devices and DG/UX[®] File Systems</i>
Configuring TCP/IP network features such as routing, Domain Name System (DNS), daemon and server program management, SNMP sendmail, and network databases.	<i>Managing TCP/IP on the DG/UX[®] System</i>
Creating and mounting file systems.	<i>Managing Mass Storage Devices and DG/UX[®] File Systems</i>

Table 7–1 Additional installation information

For this task	Refer to this manual
Customizing user environments.	<i>Using the DG/UX[®] System, Managing the DG/UX[®] System</i>
Formatting disks other than the system disk.	<i>Managing Mass Storage Devices and DG/UX[®] File Systems</i>
Installing additional software application packages.	<i>Managing the DG/UX[®] System</i>
Learn about security features.	<i>Using Security Features on the DG/UX[®] System</i>
Manage security auditing features.	<i>Managing Security Auditing on the DG/UX[®] System</i>
Manage security features.	<i>Managing Security on the DG/UX[®] System</i>
Managing the system.	<i>Managing the DG/UX[®] System, Managing Security on the DG/UX[®] System</i>
Recovering from power failures, hangs, halts, and diagnosing other system problems and errors.	<i>Preventing and Fixing Problems on the DG/UX[®] System</i>
Restoring a dual-initiator configuration.	<i>Managing the DG/UX[®] System, Managing a DG/UX[®] Cluster</i>
Running In-Service Diagnostics Acceptance Test.	<i>Using AViiON[®] Diagnostics and the AV/Aler[®] Diagnostic Support System — DG/UX[®] Environment</i>
Security auditing features.	<i>Managing Security Auditing on the DG/UX[®] System</i>
Security features, learning.	<i>Managing Security on the DG/UX[®] System</i>
Security features, managing.	<i>Managing Security on the DG/UX[®] System</i>
Setting up a DG/UX Cluster configuration.	<i>Managing a DG/UX[®] Cluster</i>
Setting up DG/UX Manager to manage DG/UX files.	<i>Using the DG/UX Manager[™] Interface</i>

Table 7–1 Additional installation information

For this task	Refer to this manual
Setting up DG/UX CLARiiON Manager to manage DG/UX files.	<i>Using the DG/UX CLARiiON Manager™ Interface</i>
Setting up disks and file systems.	<i>Managing Mass Storage Devices and DG/UX® File Systems</i>
Setting up auto-reboot for non-SCM systems.	admnvram(1) command man page. See also the boot(8) command man page.
Setting up modems.	<i>Managing Modems and UUCP on the DG/UX® System</i>
Setting up printers.	<i>Installing and Managing Printers on the DG/UX® System</i>
Setting up user home directories.	<i>Managing the DG/UX® System, Using the DG/UX® System</i>
Using stand-alone sysadm .	<i>Managing the DG/UX® System, Preventing and Fixing Problems on the DG/UX® System</i>

End of Chapter

A

Planning worksheets

This appendix contains planning worksheets for gathering information required during installation or upgrade (see Table A-1). Chapter 1 and your release notice provide information for completing the worksheets in this appendix.

Recording this data ahead of time accelerates the installation process. If you don't have this information on hand when prompted, it will disrupt the procedure. Providing incorrect information may force you to abort the process and begin again.

We suggest you photocopy the worksheets in this appendix, write your system information on the copies, and keep the worksheet copies at hand while actually performing an installation or upgrade. It's a good idea to save your planning worksheets as a record of your system's configuration after installation; they may be useful when you or someone else upgrades your system in the future.

Table A-1 Summary of planning worksheets

Worksheet	Description	When it's used during installation
Worksheet 1	Prerequisites	Before starting
Worksheet 2	Boot and system disk device names	Specifying boot device and system disk names.
Worksheet 3	Local and remote host information	Booting standalone sysadm from a remote host; specifying remote installation or upgrade information to sysadm.
Worksheet 4	Physical disk preparation	"Prepare physical disks" phase of sysadm installer
Worksheet 5	Virtual disk information	"Prepare virtual disk" phase of sysadm installer
Worksheet 6	Packages and suites to install	"Load packages" phase of sysadm installer
Worksheet 7	Optional software and package information	Setting up the optionally installable software and network packages.

Prerequisites

Complete the following prerequisite checklist before proceeding.

Worksheet 1 Prerequisite conditions for installation or upgrade

Check here	If this is true:
<input type="checkbox"/> Yes <input type="checkbox"/> No	My system has a System Control Monitor (SCM).
<input type="checkbox"/>	My system is brand new or has a newly formatted system disk (I am <i>installing</i>); or, my system is currently running DG/UX with or without installed maintenance updates (I am <i>upgrading</i>).
<input type="checkbox"/>	My system is equipped with at least the minimum required amount of memory, as specified in my notice.
<input type="checkbox"/>	If I want to install other operating systems in addition to DG/UX, I have already done so, as described in the third-party documentation. I partitioned the disk to use only what disk space was necessary to install the software.
<input type="checkbox"/>	If my system is in a dual-initiator or DG/UX cluster configuration, I have already completed necessary preparations described in related documentation.

Boot and system disk device names

- **Record your system's boot device (either local CD-ROM drive or Ethernet LAN device) and system disk drive name in the following table. Refer to your notice or your hardware operating manual to verify the correct device names for your system.**

Worksheet 2 Boot and system disk device names

Drive	Example Device Names	Actual Device Name
CD-ROM drive (if installing or upgrading from a CD-ROM)	sd(apsc(pci(),b),4)	<hr/>
Ethernet LAN device (if installing or upgrading from remotely mounted release media)	dpen() or tcen()	<hr/>
System disk drive name	sd(apsc(pci(),b),0)	<hr/>

Host information for remote installation or upgrade

- **If you are installing or upgrading using a remote file system (either on hard disk or mounted from CD-ROM), supply the necessary information for the remote host and local host. Record the information in the following tables.**

Worksheet 3 Local and remote host information for remote installation or upgrade

Item	Example	Actual
Local host name	moe	_____
Internet address of local host	128.222.2.1	_____
Internet address of local host in hexadecimal	08e00201	_____
Subnetwork mask for this host	0xffffffff00	_____
Broadcast address for this host	128.222.2.255	_____
Remote host name	godot	_____
Internet address of remote host	128.222.2.3	_____
Pathname of remote file system	/release	_____

Physical disk preparation

Unless you have read-only devices in your configuration, you can convert all devices to virtual disk format.

IMPORTANT You *must* prepare the system disk, other physical disks that contain the DG/UX operating system, or any physical disks you have to convert to virtual disk format from logical disk format (e.g., compatibility mode).

You cannot convert read-only physical devices such as CD-ROM drives or WORM (write once, read many) drives to virtual disk format.

- **In the table below, record the device names of physical disks to be prepared.**

Worksheet 4 Physical disks to prepare

Physical Disks to prepare in Virtual Disk format*
1. _____
2. _____
3. _____
4. _____

Example:

```
sd(apsc(pci(0),b),1,0)
```

* Leave these disks unregistered during installation

Virtual disks

- **Record the sizes and names you want to give to the required virtual disks. See your notice for the list of default virtual disks, required mount points, and required minimum sizes.**

Worksheet 5 Name and space requirements for virtual disks

Default virtual disk name	Required mount point directory	Required minimum size in blocks	Actual size (if different from required minimum)
root	/	_____	_____
usr	_____	_____	_____
swap	None	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
TOTAL		_____	_____

1000

- ## Worksheet 6 DG/UX software packages and suites to install

[illegible]

Software package and network setup

- **Record your optional software and network configuration information in the following table.**

Worksheet 7 Optional package and network setup

Package parameters	Example	Actual
Set up system as a node within a DG/UX cluster?	no	_____
Configure system as client of a remote NetWorker server?	no	_____
NIS domain	worknet	_____
Host	moe	_____
Host Internet address	128.224.1.2	_____
Do you subnet?	yes	_____
Network mask	0xffffffff	_____
Controller device	dgen0	_____

End of Appendix

B

Sample installation dialog

This appendix contains a sample dialog for the installation of DG/UX on a system using a boot floppy and a local CD-ROM device.

User actions, such as answering questions or pressing Enter, appear in boldface. You will see an estimate of elapsed time in the left margin, using the form `hours:minutes`.

IMPORTANT The elapsed times in this example reflect a system loading using a particular hardware and software configuration; your actual installation time may differ because of your system's configuration.

- ▶ Insert the DG/UX release medium (CD-ROM) and the boot floppy (diskette) in their respective drives.
- ▶ Power on your system. The system will reset and proceed to boot the installation floppy and display the following prompt:

`Boot command:`

- ▶ Enter the name of the CD device.

`Boot command: sd(apsc(pci()),b),4) ↵`

- ▶ You can remove the boot floppy from its drive at any time now. The boot floppy provides the initial `Boot command: prompt`. You may choose to leave it in the drive until you are sure that you will not need to start over, but you should remove it from the drive before you reboot the kernel.

After you complete the installation of the DG/UX product, the DG/UX system will provide the `Boot command: prompt`. However, you can always use the boot floppy to provide the `Boot command: prompt` or to override the system boot path if the DG/UX system is unable to do so.

```

0:01      Booting sd(apsc(pci(),b),4)
          DG/UX System Release Rn.nn Bootstrap
          Loading image
          .....
0:04      DG/UX System Release Rn.nn, Version Standalone sysadm
          Using 32 Megabytes of physical memory
          Found 1 processor
          Configuring devices .....
          Registering disks ..
          Running with no swap area.
          Using memory-resident root file system
          Creating /dev ....

INIT: SINGLE USER MODE

          Standalone Sysadm Main Menu

          1 Physical Disk ->    Manage physical disks
          2 Virtual Disk ->    Manage virtual disks
          3 File System ->     Manage file systems
          4 Install Software -> Install system software

Enter a number, a name, ? or <number>? for help, <NL> to take
the default, or q to quit: [Install Software] ↵

          Install System Software Menu

          1 Prepare physical disks ...
          2 Prepare virtual disks ...
          3 Load software ...
          4 Set up software ...
          5 Configure and Build kernel ...
          6 Reboot kernel ...
          7 All steps

Enter a number, a name, ? or <number>? for help, <NL> to take
the default, ^ to return to previous menu, or q to quit: [All
steps] ↵

1. Prepare physical disks

Run this step now? [yes] ↵
Physical disk(s) to prepare: [all] ↵

NvRAM database installed in existing partition on
sd(apsc(pci(0),B,0,7),0,0).
Bootstrap installed in existing partition on
sd(apsc(pci(0),B,0,7),0,0).

(short
pause) Physical disk sd(apsc(pci(0),B,0,7),0,0) prepared.

```

2. Prepare required virtual disks

Run this step now? [yes] ↵

Register all standard physical disks? [yes] ↵

(short
pause)

Required File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-none-	swap	-	Create	100000	sd(apsc(pci(0),B,0,7),0,0)
/	root	-	Create	60000	sd(apsc(pci(0),B,0,7),0,0)
/usr	usr	-	Create	280000	sd(apsc(pci(0),B,0,7),0,0)

Modify this information? [no] ↵

Creating /dev/dsk/swap (100000 blocks) on

sd(apsc(pci(0),B,0,7),0,0)

Virtual disk "swap" created.

Virtual disk "swap" made a volume.

Beginning swapping on /dev/dsk/swap.

Creating /dev/dsk/root (60000 blocks) on

sd(apsc(pci(0),B,0,7),0,0)

Virtual disk "root" created.

Virtual disk "root" made a volume.

Making file system on /dev/dsk/root.

Mounting /dev/dsk/root.

Creating /dev/dsk/usr (280000 blocks) on

sd(apsc(pci(0),B,0,7),0,0)

Virtual disk "usr" created.

Virtual disk "usr" made a volume.

Making file system on /dev/dsk/usr.

Mounting /dev/dsk/usr.

No existing 'halt dump' disk found. Current free disk pieces
(contiguous free space regions specified in blocks):

Physical Disk	Free Pieces
sd(apsc(pci(0),B,0,7),0,0)	543643

Create a virtual disk for halt dumps? [yes] ↵

Recommended Virtual Disks:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-none-	dump	-	Create	57000	sd(apsc(pci(0),B,0,7),0,0)

Modify this information? [no] ↵

```

Creating /dev/dsk/dump (57000 blocks) on
sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "dump" created.
Virtual disk "dump" made a volume.
Making vdm_dump(sd(apsc(pci(0),B,0,7),0,0),dump) the default
dump device.

```

3. Load software

```

Run this step now? [yes] ↵
Type of release medium: [CD-ROM] ↵

```

(short
pause)

```

DG/UX Operating System with X Window System Rn.nn of
<month/year> from Data General Corporation
Package Name(s): [development] ? ↵

```

As a convenience, package suites have been defined for this release. Suites are collections of packages. Selecting a suite causes all packages associated with that suite to be loaded from the release medium. The following list shows all suites and the packages associated with them, as well as the individual package selections.

If there are specific suites and/or packages you want to load, you may select the suite or package by name or number. Separate the names or numbers with commas. A combination of multiple suites and/or packages may be selected. Note that this results in the installation of the union of the selected suites and/or packages.

The available suites and packages are:

The suite 'development' contains the packages:

```

dgux
networker
nfs
onc
sdk
sdk.X11ge? (? for help) [yes]
tcpip
X11
dgux.man
networker.man
nfs.man
onc.man
sdk.man
sdk.X11.man
tcpip.man
X11.man

```

This suite contains the base DG/UX Operating System and Software Development Kit packages.

The suite 'production' contains the packages:

- dgux
- networker
- nfs
- onc
- tcpip
- X11
- dgux.man
- networker.man
- nfs.man
- onc.man
- tcpip.man
- X11.man

This suite contains the base DG/UX Operating System packages.

The suite 'sdk_all' contains the packages:

- sdk
- sdk.X11
- sdk.man
- sdk.X11.man

This suite contains the Software Development Kit packages. The base DG/UX Operating System packages must already be loaded.

The suite 'aco' contains the packages:

- dgux.aco
- X11.aco
- dgux.aco.man

This suite only contains the Application Capture Option. The base DG/UX Operating System packages must already be loaded.

Choices are

- 1 development
- 2 production
- 3 sdk_all
- 4 aco
- 5 dgux
- 6 dgux.aco
- 7 networker
- 8 nfs
- 9 onc
- 10 sdk
- 11 sdk.X11
- 12 tcpip
- 13 X11
- 14 X11.aco
- 15 dgux.man
- 16 dgux.aco.man
- 17 networker.man
- 18 nfs.man
- 19 onc.man
- 20 sdk.man
- 21 sdk.X11.man
- 22 tcpip.man
- 23 X11.man

Enter a number, a range of numbers (n-m, where m can be '\$' to indicate the last item), a name, the initial part of a name, <NL> to take the default, ? for help, ^ to return to the previous query, < to restart the operation, or q to quit.

...end pager? (? for help) [yes]

Package Name(s): [development] **1,4** ↵

You selected the following packages:

```

dgux
networker
nfs
onc
sdk
sdk.X11
tcpip
X11
dgux.man
networker.man
nfs.man
onc.man
sdk.man
sdk.X11.man
tcpip.man
X11.man
dgux.aco
X11.aco
dgux.X11.man
dgux.aco.man

```

Correct? [yes]

List file names while loading? [no] ↵

Answer kernel build questions before loading? [yes] ↵

System configuration identifier: [aviion] moe ↵

New [moe] system files? [yes] ↵

Operating system client? [no] ↵

Automatically reboot after building kernel? [yes] ↵

(short
pause)

Checking for recommended file system mount points

Recommended File System Mount Points:

File System Mount Point	Virtual Disk	Current Blocks	Action Required	Blocks To Add	Physical Disk
-----	-----	-----	-----	-----	-----
/usr/opt/X11	usr_opt_X11	-	Create	10000	sd(apsc(pci(0),B),0,0)
/usr/opt/networker	usr_opt_networker	-	Create	30000	sd(apsc(pci(0),B),0,0)
/usr/opt/sdk	usr_opt_sdk	-	Create	50000	sd(apsc(pci(0),B),0,0)

Modify this information? [no] ↵

```

Creating /dev/dsk/usr_opt_X11 (90000 blocks) on
  sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "usr_opt_X11" created.
Virtual disk "usr_opt_X11" made a volume.
Making file system on /dev/dsk/usr_opt_X11.
Mounting /dev/dsk/usr_opt_X11.
Creating /dev/dsk/usr_opt_networker (30000 blocks) on
  sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "usr_opt_networker" created.
Virtual disk "usr_opt_networker" made a volume.
Making file system on /dev/dsk/usr_opt_networker.
Mounting /dev/dsk/usr_opt_networker.
Creating /dev/dsk/usr_opt_sdk (50000 blocks) on
  sd(apsc(pci(0),B,0,7),0,0).
Virtual disk "usr_opt_sdk" created.
Virtual disk "usr_opt_sdk" made a volume.
Making file system on /dev/dsk/usr_opt_sdk
Mounting /dev/dsk/usr_opt_sdk.

```

```

0:30  Validating capacity of the mounted file systems
.....
.....
.....

```

NOTE: The installation utility will now start the package loading phase of the installation procedure. Once this phase begins, you cannot interrupt it.

```

0:45  Continue with the installation? [yes] ↵

```

NOTE: If the packages you have selected require setup (e.g. onc, tcpip, networker, etc.) then please wait until the next prompt appears. The delay may take up to 5 minutes depending on the number of packages you have chosen to load.

Loading DG/UX Operating System with X Window System Rn.nn of <month/year> from Data General Corporation.

NOTE: To expedite the package loading and setup steps, you can answer package setup questions in advance of package loading by pressing Enter at the prompt. If, instead, you prefer to continue the package loading and setup steps interactively and at your own pace, type no before you press Enter.

Do you want to answer, in advance, package setup questions before package loading is complete? [yes] ↵

Is this system being set up as a node within a cluster?
[no] ↵

Configure system as a client for a remote NetWorker server?
[no] ↵

Will this system be running as a node within a cluster?
[no] ↵

You now have the opportunity to create or adjust the size of the /var/opt/networker file system. This file system is needed to store the NetWorker online index and log files. The default size of 10000 blocks is enough space to store index information for multiple versions of several thousand files--about enough for a small workstation with a single disk drive. THIS IS NOT ENOUGH SPACE FOR A SERVER WITH REMOTE CLIENTS! If your system has more than one disk drive, or if it will be acting as a NetWorker server for remote clients, you probably need to allocate additional space for the online index.

/var/opt/networker File System:

File System	Virtual	Current	Action	Blocks	Physical
Mount Point	Disk	Blocks	Required	To Add	Disk
-----	-----	-----	-----	-----	-----
/var/opt/networker	var_opt_networker	-	Create	10000	sd(apsc(pci(0),B,0,7

Modify this information? [no] ↵

Creating /dev/dsk/var_opt_networker (10000 blocks) on
sd(apsc(pci(0),B,0,7),0,0)

Virtual disk "var_opt_networker" created.
Virtual disk "var_opt_networker" made a volume.
Making file system on /dev/dsk/var_opt_networker.
Mounting /dev/dsk/var_opt_networker.

Enter the NIS Domain name: **ux_kernel** ↵
[ux_kernel] Correct? [yes] ↵

The following queries refer to the primary network interface:

Enter host name: **moe** ↵
[moe] Correct? [yes] ↵
Enter host Internet address: **128.224.2.1** ↵
[128.224.2.1] Correct? [yes] ↵
Is your local network subnetted? [no] **yes** ↵
Enter the network mask: **0xffffffff00** ↵
[0xffffffff00] Correct? [yes] ↵

NOTE: Using "dpen(pci(0),C,0)" as the primary network
interface
controller.

1:05

Preparing to load the packages
.....

1:45 Loading package dgux
 Package dgux has been loaded.

 Loading package dgux.aco
 Package dgux.aco has been loaded.

 Loading package networker
 Package networker has been loaded.

 Loading package nfs
 Package nfs has been loaded.

 Loading package onc
 Package onc has been loaded.

 Loading package sdk
 Package onc has been loaded.

 Loading package sdk.X11
 Package onc has been loaded.

 Loading package tcpip
 Package tcpip has been loaded.

2:00 Loading package X11
 Package X11 has been loaded.

 Loading package X11.aco
 Package X11.aco has been loaded.

 Loading package dgux.man
 Package dgux.man has been loaded.

 Loading package dgux.aco.man
 Package dgux.aco.man has been loaded.

 Loading package networker.man
 Package networker.man has been loaded.

Loading package nfs.man
 Package nfs.man has been loaded.

Loading package onc.man
 Package onc.man has been loaded.

Loading package sdk.man
 Package onc has been loaded.

Loading package sdk.X11.man
 Package onc has been loaded.

Loading package tcpip.man
 Package tcpip.man has been loaded.

Loading package X11.man
 Package X11.man has been loaded.

Package load is finished.
 The selected packages have been loaded.

4. Set up software

Setting up dgux in usr.

Initializing DG/UX /usr files

Continuing setup of DG/UX

NOTE: See `srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux usr`
 for a detailed account of the usr setup of DG/UX.

Package dgux has been successfully set up in usr.
 Setting up dgux in MY_HOST root.

Setting up DG/UX

Initializing DG/UX prototype files.....

Creating DG/UX run level links.....

Initializing sysadm(1M)

.....

NOTE: See `/srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/dgux.root`
 for a detailed account of the root setup of DG/UX.

Package dgux has been successfully set up in MY_HOST root.
Package setup for dgux is complete.

Setting up dgux.aco in usr.
Setting up dgux.aco in MY_HOST root.
package dgux.aco has been successfully st up in usr.
Initializing dgux.aco prototyping files.....
Linking sort names for /dev device modes
Package dgux.aco has been successfully set up in MY_HOST
root.
Package setup for dgux.aco is complete.

Setting up dg/ux.aco.man in usr.
Setting up dgux.aco.man man pages:...

Package dgux.aco.man has been successfully set up in usr.
Package setup for dgux.aco.man is complete.

Setting up dg/ux.man in usr.
Setting up dgux.man man pages:...

Package dgux.man has been successfully set up in usr.
Package setup for dgux.man is complete.

Setting up networker in usr.
Creating symbolic links ...
Package networker has been successfully set up in usr.
Setting up networker in MY_HOST root.

Creating Networker run level links.....
..Package networker has been successfully set up in MY_HOST
root.
Package setup for networker is complete.

Setting up nfs in MY_HOST root.

Setting up NFS in MY_HOST root....

Creating NFS run level links.....

Initializing NFS prototype files.....

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/nfs.root
for a detailed account of the root setup of NFS.

Package nfs has been successfully set up in MY_HOST root.
Package setup for nfs is complete.

Setting up nfs.man in usr.
Setting up nfs.man man pages:...

Package nfs.man has been successfully set up in usr.
Package setup for nfs.man is complete.

Setting up onc in MY_HOST root.

Initializing ONC prototype files.....
 Creating ONC run level links.....

NOTE: This host will first run as an NIS client.

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/onc.root
 for a detailed account of the root setup of ONC.

Package onc has been successfully set up in MY_HOST root.
 Package setup for onc is complete.

Setting up onc.man in usr.
 Setting up onc.man man pages:...

Package onc.man has been successfully set up in usr.
 Package setup for onc.man is complete.

Setting up sdk in usr.

.....

Package sdk has been successfully set up in usr.
 Package setup for sdk is complete.

Setting up sdk.man in usr.
 Setting up sdk.man man pages:...

Package sdk.man has been successfully set up in usr.
 Package setup for sdk.man is complete.

Setting up sdk.X11 in usr.
 Creating sdk.sde directories and links..
 Package sdk.X11 has been successfully set up in usr.
 Package setup for sdk.X11 is complete.

Setting up tcpip in usr.
 Setting up tcpip...

NOTE: The /usr/bin/rsh command now executes as a remote
 shell(remsh), not as a restricted shell(restsh).

NOTE: See /srv/release/PRIMARY/root/MY_HOST/var/setup.d/log/tcpip usr
 file for a verbose description of the package setup for usr.

Package tcpip has been successfully set up in usr.
 Setting up tcpip in MY_HOST root.
 Setting up tcpip ...
 Creating TCP/IP run level links ...
 Continuing TCP/IP setup.....

NOTE: See /var/setup.d/log/tcpip.root file for a
 verbose description of the package setup for root.

Package tcpip has been successfully set up in MY_HOST root.
 Package setup for tcpip is complete.

```
Setting up tcpip.man in usr.
Setting up tcpip.man man pages:...
```

```
Package tcpip.man has been successfully set up in usr.
Package setup for tcpip.man is complete.
```

```
Setting up X11 in usr.
  Creating X11 directories and links.....
  Creating root and usr prototypes for X11.....
  Cleaning up the SDK area.
```

```
Package X11 has been successfully set up in usr.
Setting up X11 in MY_HOST root.
Package X11 has been successfully set up in MY_HOST root.
Package setup for X11 is complete.
```

```
Setting up X11.aco in usr.
  Creating X11 directories and links.....
  Creating root and usr prototypes for X11.....
Package X11.aco has been successfully set up in MY_HOST
root.
Package setup for X11.aco is complete.
```

```
Setting up X11.man in usr.
  Creating X11.man directories and links..
Setting up X11.man man pages.
```

```
Package X11.man has been successfully set up in usr.
Package setup for X11.man is complete.
```

5. Configure and Build kernel

2:30

```
Configuring system...
Building kernel...
Successfully built dgux.moe.
Linked /dgux. You must reboot in order for this kernel to
take effect.
```

CAUTION *If the system required a boot floppy for installation, remove it from the diskette drive before rebooting the kernel.*

6. Reboot kernel

```
....
Boot command: sd(apsc(pci(),0),0) root -f /dgux -i 3 ↵
```

```
Booting sd(apsc(pci(0),B,0,7),0,0) root -f /dgux -i 3
DG/UX System Release n.nn Bootstrap
Loading image
```

```
.....
```

```

Cleaning up failover database ...
    Starting failover monitors ...
    Starting Floating IP Addresses ...
    Starting Multi-Path I/O ...

DG/UX System Release n.nn, Version generic
Using 32 Megabytes of physical memory
Found 1 processor
Configuring devices .....
Registering disks ..
Using vdm(swap,2D039A43,0C027700,0) as swap disk.
No check necessary for vdm(root,2D1F019E,0C027700,0).

Mounting vdm(root,2D1F019E,0C027700,0) as root file system.
Creating /dev ....

Checking local file systems .....
Mounting local file systems .....
Current date and time is <day month date time year> ...

Checking system files .....
WARNING: These local accounts need passwords:
    root
    sysadm
    Assign passwords as soon as possible.

Continuing system initialization ....
Enabling automatically pushed STREAMS modules .....
Linking short names for /dev device nodes .....

Loading terminal controllers ....
Starting disk daemons ....
Mounting local file systems .....
Checking for packages that have not been set up ...
Starting miscellaneous daemons ...
Starting STREAMS error logging daemon ....
Starting Logical Link Control Services ....
Restoring TCP/IP tunable parameters
Attaching TCP/IP network interfaces .....
Starting system logging daemon ....
    Starting NIS services as NIS client .....
Starting NFS lock services .....
    Starting batch services ....
Starting line printer scheduler ....
Saving ex(1) and vi(1) temporary files ....
Starting NFS services .....

```

```
Starting TCP/IP daemons .....
Mounting NFS file systems .....
    Starting DG/UX administrative services .....
Starting NetWorker server daemons .....
```

```
NOTE:  The run level change is complete.  See
       /etc/log/init.log for a verbose description
       of the system initialization process.
```

2:45 Press New Line to continue.

```
moe
DG/UX Operating System Rn.nn
Console Login:
```

End of Appendix

C

Using the boot command

The **boot** command loads and executes stand-alone executables. Although boot is used primarily for loading and executing the DG/UX system kernel or the stand-alone **sysadm** utility, it can load and execute other programs that are linked for stand-alone execution.

The syntax of the **boot** command is:

```
[boot] phys-dev-name [ volume-name ] [ -f filename ]  
[ -r [root-pdisk-name] root-vdisk-name ]  
[ -s [swap-pdisk-name] swap-vdisk-name ]  
[ -i init-options ] [ -k root-fsck-options ]  
[ -a ] [ -d ] [ -I ] [ -D ] [ -R ] [ -l keyboard-language ]  
[ -n node_number ] [ -c [cdb_pdisk] cdb_vdisk ] [ -g ]
```

where:

phys-dev-name is a physical device or network controller to be used as a boot source.

volume-name is a virtual disk or IP address associated with *phys-dev-name*.

The boot operation loads and executes stand-alone executables. Although the boot operation is used primarily for loading and executing the DG/UX system kernel or the stand-alone **sysadm** utility, it can load and execute other programs that are linked for stand-alone execution.

The implementation of the boot operation varies on different hardware platforms. On some hardware, the **boot** command itself is not issued, and booting is accomplished via a menu or other interactive dialogue. Some platforms offer the ability to boot from a diskette or a CD-ROM. Some boot options apply only to specific hardware or DG/UX features.

Use your hardware documentation and DG/UX notice in combination with this documentation to determine the options and features applicable on your system.

For sample **boot** command lines, see “Examples of boot command lines” later in this chapter.

Boot operation parameters common to all systems

You always need the *phys-dev-name* argument when you boot a system. The argument must specify a physical disk device or network controller in DG/UX common device name format. The boot operation interacts with this physical device and attempts to locate a stand-alone executable stored there.

The search for an executable can be limited to a specific volume on the physical device. The volume can be specified in the *volume-name* argument. Otherwise, a default will be used.

The meaning of *volume-name* varies with the device type, as follows:

- If *phys-dev-name* is a disk, *volume-name* is the name of a virtual disk that exists entirely on that physical disk. If *volume-name* is not specified, the physical disk is examined for a default root virtual disk previously set by the **admpdisk**(1M) command. If no default is set on the physical disk, the name **root** is used.
- If *phys-dev-name* is a network device, *volume-name* is the IP address, in Internet dot notation (e.g., 111.222.333.444), to be used by the network controller. If *volume-name* is not specified, the default address is obtained by sending a network broadcast request.

Options common to all boot operations

[**-f** *filename*]

The name of the executable to be booted. If *phys-dev-name* is a disk, *filename* is a pathname within the file system on *volume-name*. If *phys-dev-name* is a network device, *filename* is the pathname of the kernel image to be booted, relative to the boot client root directory on the boot server host. In either case, the default *filename* is **/dgux**.

Most of the remaining options affect the operation of the booted executable rather than the boot operation itself.

Options affecting DG/UX kernels

[**-r** [*root-pdisk-name*] *root-vdisk-name*]

The virtual disk device to be used as the root file system. *root-vdisk-name* specifies the name of the virtual disk device, and *root-pdisk-name* specifies the name of the physical disk containing it. *root-pdisk-name* is required only if multiple virtual disks named *root-vdisk-name* exist among the physical disks that will be registered by the kernel. If **-r** is not specified, the booted kernel attempts to find the following defaults, in this order:

1. A default root virtual disk name previously set on *phys-dev-name* by the **admpdisk**(1M) command.
2. A virtual disk named **root** on *phys-dev-name*.
3. A default root virtual disk on any registered disk.

[**-s** [*swap-pdisk-name*] *swap-vdisk-name*]

The virtual disk device to be used as the swap device. *swap-vdisk-name* specifies the name of the virtual disk device, and *swap-pdisk-name* specifies the name of the physical disk containing it. *swap-pdisk-name* is required only if multiple virtual disks named *swap-vdisk-name* exist among the physical disks that will be registered by the kernel. If **-s** is not specified, the booted kernel attempts to find the following defaults, in this order:

1. A default swap virtual disk name previously set on *phys-dev-name* by the **admpdisk**(1M) command.
2. A virtual disk named swap on *phys-dev-name*.
3. A default swap virtual disk on any registered disk.

[**-i** *init-options*]

The options to be supplied as arguments to the **init**(1M) command after the kernel starts running. The most common argument is the run level.

[**-k** *root-fsck-options*]

The options to be supplied as arguments to the **fsck**(1M) command for checking the root file system during system initialization.

Options specific to the DG/UX Cluster option

[**-n** *node_number*]

The node number used by the DG/UX kernel to join a cluster. In addition, if neither *volume_name* nor **-f filename** are specified on the boot command line, the boot operation accesses a cluster database located on *phy-dev_name*. Using *node_number* as an index, it retrieves *phy_dev_name*, *volume_name*, and *filename* from the cluster database and uses them to locate the executable image to be booted.

[**-c** [*cdb_pdisk_name*] *cdb_vdisk_name*]

Virtual disk *cdb_vdisk_name*, located on physical device *cdb_pdisk_name*, specifies the location of the cluster database used by the boot operation. If **-c** is not specified, "cluster db" is used as the default *cdb_vdisk_name*. If *cdb_pdisk_name* is not specified, *phy_dev_name* is used as the default. The **-c** option is ignored unless **-n** is specified.

[**-g**]

Boot the node in cluster administration mode. If this option is specified while any other nodes are already active, the boot will fail.

Options specific to stand-alone sysadm

- [**-I**]
Boot stand-alone **sysadm** as a non-diskless installer kernel.
- [**-D**]
Boot stand-alone **sysadm** as a diskless installer kernel.
- [**-R**]
Boot stand-alone **sysadm** as a CD-ROM installer kernel.

Options specific to the boot operation

The following options are recognized solely by the boot operation and have no effect on DG/UX stand-alone executables.

- [**-a**]
Ask for a **boot** command line instead of using the one that initiated the boot operation. This option is used only for debugging.
- [**-d**]
Invoke a diskless client memory dump. The DG/UX system uses this option only when halting abnormally. It should never be entered on a command line.

Options specific to hardware without SCM

- [**-l keyboard-language**]
A four-character string describing the system keyboard. (If both **-l** and an NDB entry are present, the value supplied with **-l** is used.) The first two characters represent the country, as specified by ISO 3166. The second two characters represent the language, as specified by ISO 639. Currently supported keyboards are:

USen	United States / English; this is the default
CHde	Switzerland / German
DEde	Germany / German
DKdk	Denmark / Danish
ESes	Spain / Spanish
FRfr	France / French
GBen	Great Britain / English
ITit	Italy / Italian
NOno	Norway / Norwegian
PTpt	Portugal / Portuguese
SEsv	Sweden / Swedish

Booting without SCM

Hardware without an SCM relies on DG/UX support that may not be described in the hardware documentation. This section provides additional information necessary for booting without an SCM.

NVRAM database parameters

Most hardware platforms that support the DG/UX system offer a System Control Monitor (SCM) that stores default system information in Non-Volatile RAM (NVRAM). Platforms lacking this support can use a DG/UX feature called the NVRAM database (NDB) to store the same information. The NDB can be modified only while the DG/UX system is running.

Use the **admnvram**(1M) command to store parameter/value pairs in the NDB while the DG/UX system is running. When the system is next booted, the boot operation examines the NDB and acquires values associated with certain parameters. See the **admnvram**(1M) man page for examples of setting these parameters.

The following NDB parameters are used by the boot operation:

boot_command_*n*

NDB entries of this type represent default command lines that can be executed by the boot operation. These command lines must not include the **boot** keyword, and *n* must be in the range 1 through 9. All arguments and options are acceptable, subject to hardware restrictions.

boot_timeout

The decimal number of seconds the bootstrap will wait before automatically booting the command line specified by **boot_command_***n*. A value of 0 disables automatic booting.

keyboard_language

Same action as the **-l** option . (If both **-l** and a keyboard language NDB entry are present, the value supplied with **-l** is used.)

Identifying the boot disk

Normally, you will *not* need to identify the boot disk because the system will automatically identify the correct boot disk for you in almost every case. The following information does explain how to supply the boot disk name to **admnvram**(1M), if for some reason you do not want to let the system do it by default.

A system without an SCM selects a single boot disk from all of the disks in its configuration. Selection of this disk cannot be modified by you or by the DG/UX system. You must analyze the hardware configuration to determine which disk the hardware will select, and specify that disk name to the **admnvram**(1M) command when creating or modifying an NDB.

Usually, if a diskette is in the diskette drive, the system uses it as the boot disk (unless configured otherwise in firmware). If an NDB is installed on the diskette, the boot operation will check it for a boot disk default.

Otherwise, the system uses the following algorithm to select a boot disk:

1. Use the lowest-numbered PCI bus.
2. Use the SCSI adapter card installed in the lowest-numbered slot on that bus.
3. Use the lowest-numbered SCSI ID connected to that adapter.
4. Use the lowest Logical Unit Number (LUN) on that SCSI ID.

Initiating the boot operation

If the DG/UX system is running, it initiates the boot operation at completion of the **halt**(1M) or **reboot**(1M) command. The boot operation also is initiated whenever you power-up the system or press the reset button. Once initiated, the boot operation acquires information from a boot disk.

Most hardware with no SCM comes with both a diskette drive and a hard disk. Either can be used as a boot disk if it is properly formatted and DG/UX bootstraps are installed (see **admpdisk**(1M)). If a diskette is installed in the diskette drive, the hardware usually ignores the hard disk and attempts to use the diskette as the boot disk. (This behavior may be configurable in firmware.) Most hardware without an SCM cannot boot directly from CD-ROM.

Automatic booting

If the boot disk contains an NDB with default **boot** command lines, the lowest-numbered **boot_command_n** string in the NDB is used as the initial default. A timer runs for **boot_timeout** seconds to allow you to override this default. When the timer expires, the boot operation attempts to boot the default command line. If the boot fails, the operation attempts to boot the remaining **boot_command_n** entries in numerical order. If they all fail, you are prompted for a **boot** command line. The command line must not contain the **boot** keyword.

If no default **boot** command lines are stored, or if you request an override during the timeout period, the boot operation prompts for some or all of the following information:

- On hardware with several installed operating systems, the DG/UX boot operation prompts you to select one of them. If you select an operating system other than DG/UX, control transfers to that operating system's boot operation. Otherwise, the DG/UX boot operation proceeds.

- If default **boot** command lines are stored on the boot disk, the DG/UX boot operation prompts you to select one of them for booting or to enter a **boot** command line. The command line *must not* contain the **boot** keyword.

How a system console is selected

The DG/UX boot operation and the stand-alone executables both communicate with you through a system console. If the hardware has a keyboard directly attached when the boot operation begins, that keyboard and its associated display are used as the system console. If no keyboard is attached, the console serial port is used (COM1 port on Intel machines).

Examples of boot command lines

To boot stand-alone **sysadm** on a machine with an integrated SCSI adapter, enter a **boot** command line similar to the following at the SCM prompt:

```
SCM> boot sd(insc()) usr -f /stand/sysadm
```

To boot a machine using a kernel from virtual disk **root** on physical disk **sd(apsc(pci(1),f),0)** and then have that kernel use virtual disk **root4** from the same disk as the root file system and virtual disk **swap2** from **sd(apsc(pci(1),f),1)** as the swap device, enter a **boot** command line similar to the following at the SCM prompt:

```
SCM> b sd(apsc(pci(1),f),0) -r root4 -s sd(apsc(pci(1),f),1) swap2
```

To boot a machine with a Swedish keyboard to run level 3, enter a **boot** command line similar to the following when prompted for a **boot** command:

```
Boot Command: sd(apsc(pci(1),f),0) -l SEsv -i 3
```

To boot a kernel named **/dgux.myhost** to run level 1, enter a **boot** command line similar to the following when prompted for a **boot** command:

```
Boot Command: sd(apsc(pci(1),f),0) -f /dgux.myhost -i 1
```

See also

For more information, see also the **admnvram**(1M) and the **init**(1M) man pages.

End of Appendix

D

Fixing installation problems

This appendix identifies problems you may encounter while installing or upgrading your DG/UX system, and recommends appropriate recovery action. It includes the following major sections:

- Responding to error messages
- Addressing insufficient swap space
- Addressing insufficient space to load packages
- Receiving a system halt
- Selecting to load all packages by mistake
- Supplying the wrong data at a package setup prompt
- Upgrade problem with **/tmp** while preparing to load software packages
- When rebooting fails
- When booting to init 3 fails

If we haven't documented your problem here, refer to *Preventing and Fixing Problems on the DG/UX System*, which contains tips and techniques on preventing and fixing typical system problems. If the problem persists, contact Data General for assistance.

Responding to error messages

Table D-1 provides a quick reference for resolving the problems described in this appendix. Refer to the sections that follow for more detailed explanation and instructions.

Table D-1 Responding to error messages

Error text or screen display	Explanation and response
<p>The operating system has detected a serious error and halted. Please record the following halt code: "DG/UX halt code nnnnnnnn"</p> <p>Do you want to take a system dump? [Y]</p>	<p>A system halt indicates a fatal hardware malfunction or internal software inconsistency.</p> <p>Write down the halt code number and restart the installation. If the error reoccurs, complete a system dump and contact Data General as described in the Preface. You may also run AViiON diagnostics.</p>
Out of swap space	<p>The swap virtual disk is too small for system operation. Increase swap as described in <i>Managing the DG/UX[®] System</i>.</p>
<pre>/root//tmp: file exists UX: mkdir: ERROR: Cannot create directory "/root//tmp": file exists**** Error: Cannot create directory /root//tmp/root.proto.tmp Press New Line to continue.</pre>	<p>The installer encountered a symbolic link with an absolute rather than a relative target pathname during an upgrade.</p> <p>Change the link (for the tmp file, in this example) and restart the upgrade.</p>
<p>Warning: There is not enough room in /mnt/root to load nnnn blocks, as only nnnn blocks are available.</p> <p>To make space available now, you may clean up the system before loading packages. The cleanup scripts will list the pathname and files that you may want to remove. NOTE: No file will be removed without your explicit confirmation.</p> <p>Clean up the system before loading packages? [yes]</p>	<p>You don't have the disk space needed to load the packages you selected.</p> <p>Your choices are to:</p> <ul style="list-style-type: none"> ● Run a cleanup script now to reclaim disk space. ● Restart the installation; then, select packages that require less space or increase virtual disk size. <p>Don't proceed without fixing the problem, as installation will almost certainly fail.</p>

Addressing insufficient swap space

Insufficient swap space can result in the termination of running processes, and errors such as “out of swap space” displayed at the system console.

If you encounter such an error, increase swap by expanding the existing **swap** virtual disk or creating additional swap area virtual disks (such as **swap1** and **swap2**). For more details, refer to the information on sizing a virtual disk for swap space in Chapter 1 or to the manual *Managing the DG/UX® System*.

Addressing insufficient space to load packages

During an upgrade, the installer utility validates the free space in your configuration before loading packages. If you receive a warning that you do not have sufficient space to successfully upgrade your system, you must address the problem before continuing.

The warning message appears as follows:

```
Warning:  There is not enough room in /mnt/root to
          load 18332 blocks, as only 17247 blocks
          are available.
```

To make space available now, you may clean up the system before loading packages. The cleanup scripts will list the pathname and files that you may want to remove.

NOTE: No file will be removed without your explicit confirmation.

```
Clean up the system before loading packages? [yes]
```

You may answer **yes** or **no**. If you answer **yes**, the installation utility will check your configuration and make recommendations for files to delete, which frees up space. Go to the next section for instructions on performing an assisted cleanup.

If you answer **no** because you do not want to clean up the system before loading, you can pursue either of two paths:

- You could proceed to the next upgrade step, package loading. Since your system does not have enough free space to accommodate loading, however, package loading will eventually fail.
- You can restart the upgrade procedure, resizing virtual disks or omitting selected packages from loading. Go to the section on restarting the upgrade later in this appendix.

Performing an assisted cleanup

When you choose to clean up the system before loading packages, the installation utility immediately begins its search for files that can be deleted. Each time it locates a file for deletion, it displays the file's path and size, and presents an opportunity to delete it.

- 1. To delete the recommended file, override the default and type *yes*, and then press *Enter*.**

Alternatively, you may note the recommendation, answer **no** and later escape to the shell to investigate before deleting.

An example of the installation utility's recommendations follows.

```
Searching for large files in /mnt/root/var ...

6 files found.
Warning:  Typing 'yes' will permanently remove the file.

Remove /mnt/root/var/adm/spellhist (128 blocks)? [no]
Remove /mnt/root/var/adm/dgsvcmgr/dgsvcd_log (128 blocks)?
[no]
Remove /mnt/root/var/lp/logs/lpNet (144 blocks)? [no]
Remove /mnt/root/var/saf/_log (80 blocks)? [no]
Remove /mnt/root/var/saf/ttymon1/log (177 blocks)? [no]
Remove /mnt/root/var/cron/log (7349 blocks)? [no]

Searching for old files in /mnt/root/tmp ...

2 files found.
Warning:  Typing 'yes' will permanently remove the file.

Remove /mnt/root/tmp/vi.tar (6277 blocks)? [no]
Remove /mnt/root/tmp/fl (193 blocks)? [no]

Searching for obsolete programs ...

1 program found.
Warning:  Typing 'yes' will permanently remove the file.

Searching for non-standard files ...

39 files found.
Warning: Typing 'yes' will permanently remove the file.
Remove /mnt/root/archive/LogFile (32 blocks)? [no]
Remove /mnt/root/archive/LogFile.old (32 blocks)? [no]
Remove /mnt/root/archive/LogFile.save (32 blocks)? [no]
Remove /mnt/root/archive/Nightly (16 blocks)? [no]
Remove /mnt/root/archive/RunArchive (64 blocks)? [no]
Remove /mnt/root/dgux (6565 blocks)? [no]
```



```
Remove /mnt/root/dgux.viper (6565 blocks)? [no]
Remove /mnt/root/etc/fstab_OLD (32 blocks)? [no]
```

After the installation utility has finished its recommendations, it asks if you want to escape to the shell to manually free up space.

2. Decide if you want to perform manual cleanup.

```
Escape to the shell to perform manual cleanup? [yes]
```

You may answer **yes** or **no**.

- ▶ If you answer **yes**, you will escape to the shell where you can perform manual cleanup. Proceed to **step 3**.
- ▶ If you answer **no** and forgo a shell escape for continued cleanup, the installation utility checks space again, displaying this message:

```
Checking the capacity again ...
```

If you have freed up sufficient space for package loading, the warning message will not be displayed this time. Otherwise, it will be redisplayed. The process repeats until there is sufficient free space to load packages.

After you have freed up sufficient space for package loading, you can proceed to **step 4**.

3. Perform manual cleanup from the shell.

If you are aware of other files to remove, do so. If you did not delete the files that the installation utility recommended, you may investigate them now and remove them, as desired.

After you have freed up sufficient space for package loading, you can proceed to **step 4**.

4. After you finish your manual cleanup from the shell, resume the upgrade procedure by exiting the shell. For example:

```
# exit ↵
```

The installation utility checks space again, displaying this message:

```
Checking the capacity again ...
```

If you have freed up sufficient space for package loading, the warning message will not be displayed this time. Otherwise, it will be redisplayed. The process repeats until there is sufficient free space to load packages.

Restarting the upgrade

You may restart the upgrade, this time making different virtual disk sizing decisions. Or, you may decide to omit some optional packages for loading. The system will prompt you as follows:

```
Clean up the system before loading packages? [yes]
```

1. To free up space manually, without the assistance of the installation utility, answer no. For example:

```
Clean up the system before loading packages? [yes] no ↵
```

The system will display a note, followed by a prompt.

2. Read the entire note before answering.

```
NOTE: You can restart the software installation
       procedures and expand your virtual disks or
       select a different set of packages. If you
       want to begin loading packages, even though
       there is not enough room, type "no" at the
       prompt below.
```

```
Restart the software installation procedures? [yes]
```

- ▶ To restart the upgrade, this time making different decisions, accept the **yes** default, and go to **step 3**.
- ▶ To continue the upgrade procedure, despite a warning that there is insufficient space for package loading, answer **no**. Eventually the upgrade will fail.

3. Decide whether to modify or confirm your default configuration.

When the upgrade procedure restarts, you may want to modify the default configuration, creating larger virtual disks, as necessary. Or, you may confirm your default configuration selections, and alter your package selections for loading instead.

For example, exclude packages that are not critical for your normal operation. Review package descriptions in the notice to help you decide.

After you have freed up space, the installation utility checks space again, displaying this message:

```
Checking the capacity again ...
```

If you have freed up sufficient space for package loading, the warning message will not be displayed this time. Otherwise, it will be redisplayed. The process repeats until there is sufficient free space to load packages.

Receiving a system halt

A system halt is a condition indicating a fatal hardware malfunction or internal software inconsistency. How you respond to a system halt depends on whether you receive the error early in system initialization or during package loading.

System halt early in system initialization

A system halt that occurs early in system initialization usually results from serious system failures, such as hard memory failures, or an inability to load kernel image properly during the boot process. When such an error occurs, the standard kernel dump mechanism is not yet operational. Instead, debug screens will display the general register contents and some kernel stack trace information generated around the time of the system halt.

To fix a system halt generated early in system initialization, first try to reboot the system. If the error persists, contact your Data General hardware support representative with the general register and trace information in an attempt to identify the failing unit.

System halt during disk preparation

A system halt during the “Prepare physical disks” step or early in the “Prepare virtual disks” step of the installation procedure can indicate that you tried to format or register too many physical disks.

The recommended solution is to format and/or register only those physical disks necessary to install the DG/UX system. These are the physical disks that hold the OS virtual disks like **root**, **swap**, **dump**, **usr_opt_networker**, and **usr_opt_X11**.

System halt during package loading

A system halt that occurs during package loading indicates a fatal hardware malfunction or internal software inconsistency. The installer kernel halts the package loading procedure and issues a message and prompt in the following format:

```
The operating system has detected a serious error and halted
Please record the following halt code:
“DG/UX halt code nnnnnnnnn”
```

```
Do you want to take a system dump? [Y]
```

Before answering, write down the actual halt code number received and any other accompanying error messages. Follow these steps to recover from the problem:

- Perform a system dump.
- Perform diagnostics.
- Resume the installation or upgrade procedure.

Performing a system dump

The Data General Customer Support Center needs a copy of the contents of the system memory to investigate the cause of a system halt. Follow these steps to perform a system dump of the memory.

IMPORTANT For more information on performing a system dump, refer to *Preventing and Fixing Problems on the DG/UX® System*.

1. Accept the `yes` default response to the prompt to perform a system dump.
2. Insert a blank tape in the drive to receive the system memory contents.
3. When prompted, supply the name of the dump device; for example, the device name for a tape might be:
`st(apsc(pci(1),f),6)`
4. When prompted for the type of dump to be performed, specify a system dump (system memory contents).
5. Remove the dump tape from the drive when the system tells you that the dump is complete.

Performing diagnostics

A set of system diagnostics provides menu-based utilities to fully test your computer. If there is a hardware problem, the system diagnostics can isolate faults and provide the information necessary for Data General to replace defective parts. For information on running system diagnostics and the acceptance test, refer to *Using AViiON® Diagnostics and the AV/Alert Diagnostics Support System*. Record the results for relaying to the Data General Customer Support Center.

Resuming the installation or upgrade procedure

Following the completion of system diagnostics, exit the diagnostics program and remove the diagnostics medium from its drive. Re-install the DG/UX system using the procedures from the chapter appropriate to your situation.

If the installation or upgrade procedure completes successfully, continue steps to customize and operate, as desired, but still submit the details of the problem to the Data General Customer Support Center. If the installation or upgrade failure persists, contact the Data General Customer Support Center immediately.

Selecting to load all packages by mistake

If you accidentally select to load all packages when previously you chose not to build virtual disks for all packages, the recovery on a clean installation is to start again from scratch. Type **q** to quit at the next available prompt. However, if you are performing an upgrade, you can either clean up a file system or add space to it.

Supplying the wrong data at a package setup prompt

After you build and successfully boot a new kernel, your system may be inoperable because you supplied incorrect data to one or more package setup queries. The data may be valid input, but may inaccurately reflect your configuration. For example, supplying an inaccurate Internet address during the **tcpip** package setup process may be syntactically correct to the system, but will prevent a successful network connection. As a consequence, you cannot access remotely mounted file systems, nor can you exchange electronic mail.

If you supplied incorrect data to a package setup query, you must perform package setup again, this time providing the correct data. Follow these steps to recover:

1. At the shell prompt, log in as **root** (become superuser) and supply the correct password.

```
# su ↵
```

2. Rerun package setup for the desired package, such as **tcpip**, using the **sysadm** operation Software -> Package -> Setup or a command similar to the following:

```
# admpackage -o setup -F -rPRIMARY tcpip ↵
```

Answer the queries for package setup, this time supplying the correct data. Refer to the section on package setup in the appropriate chapter for a review of the procedure.

For more information about setting up application software, see *Managing the DG/UX® System*.

Upgrade problem with /tmp while preparing to load software packages

This problem occurs only during an upgrade. The system presents this progress message prior to package loading and setup:

```
Preparing to load the packages .....
```

If you receive the following message:

```
/root//tmp: file exists
UX: mkdir: ERROR: Cannot create directory "/root
//tmp": file exists
```

```
**** Error: Cannot create directory
/root//tmp/root.proto.tmp
```

Press New Line to continue.

you previously created a symbolic link for the **tmp** file using an absolute rather than a relative pathname. You may have created a symbolic link from **/tmp** to **/var/tmp** or from **/var/tmp** to **/tmp** as follows:

```
ln -s /var/tmp /tmp
ln -s /tmp /var/tmp
```

You need to change the symbolic link's absolute pathname to a relative pathname before you can continue. Follow these steps:

1. Press Enter to end the installation process.
2. Type **q** and press Enter to quit the installation utility.
3. Reboot the system.
 - If your system has an SCM, you can reboot from the system disk. Enter the appropriate boot command for your platform at the **SCM>** prompt. For example:


```
SCM> b sd(apsc(pci(1),f),0) ↵
```
 - If your system does not have an SCM, you must turn off the power to your computer, and then turn it on again. The system will automatically reboot.

4. After the system boots, log in as **root**.
5. To change the absolute pathname to a relative pathname, type the following commands from the shell prompt.

► If you linked **/tmp** to **/var/tmp**, use these commands:

```
# cd / ↵
# rm tmp ↵
# ln -s var/tmp tmp ↵
```

► If you linked **/var/tmp** to **/tmp**, use these commands:

```
# cd /var ↵
# rm tmp ↵
# ln -s ../tmp tmp ↵
```

6. Restart the upgrade procedure using the chapter appropriate to your situation.

While repetition of the upgrade procedure up to the point of failure is unavoidable, you can step quickly through most of the prompts by pressing Enter to accept the answers you've already given.

When rebooting fails

If instead of rebooting, the system displays the `Boot command:` prompt, you must enter the **boot** command for your system. Remember that you are booting from the hard disk to init level 3. For example:

Boot command: **sd(apsc(pci(0),b),0) root -f/dgux -i 3** ↵

You can use the command above, substituting the device name for your system in place of **sd(apsc(pci(0),b),0)**. When you see the login screen, proceed to Chapter 7 to complete your installation.

If you are not sure of the boot device name when booting off the system disk, refer to the notice.

When booting to init 3 fails

If you do not use the default configuration and you set up the **/var** file system separately from the **/** (root) file system, you will not be able to boot to init 3. This is because the init process attempts to make **/var/adm/utmp** entries before the **/var** file system is mounted. You will receive a write error and the system will stop at run level s, even if you specified booting to run level 3.

You can correct this problem by adding the following entry to your **/etc/inittab** file to mount the independent **/var** file system.

```
mnt::sysinit:/sbin/mount /var </dev/syscon >/dev/syscon 2>&1
```

You can edit the **/etc/inittab** file from init level **s**, after which you should halt the system and reboot.

End of Appendix

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Installing the DG/UX[®] System

069-701140-04



Installing the DG/UX[®] System

